

R/C CAR ACTION 1995

Radio Control

47380

BONUS! 32pg. On-Road & Parking-Lot  
**Buyers' Guide**

# CAR ACTION

THE WORLD'S LEADING R/C CAR MAGAZINE

August 1995

## THE Best Sedans

Tamiya,  
Kyosho,  
Schumacher,  
Yokomo

**12** of '95  
Models  
reviewed

**KILLER CLOD MODS**  
BENNETT'S Clod-A-Leaver II

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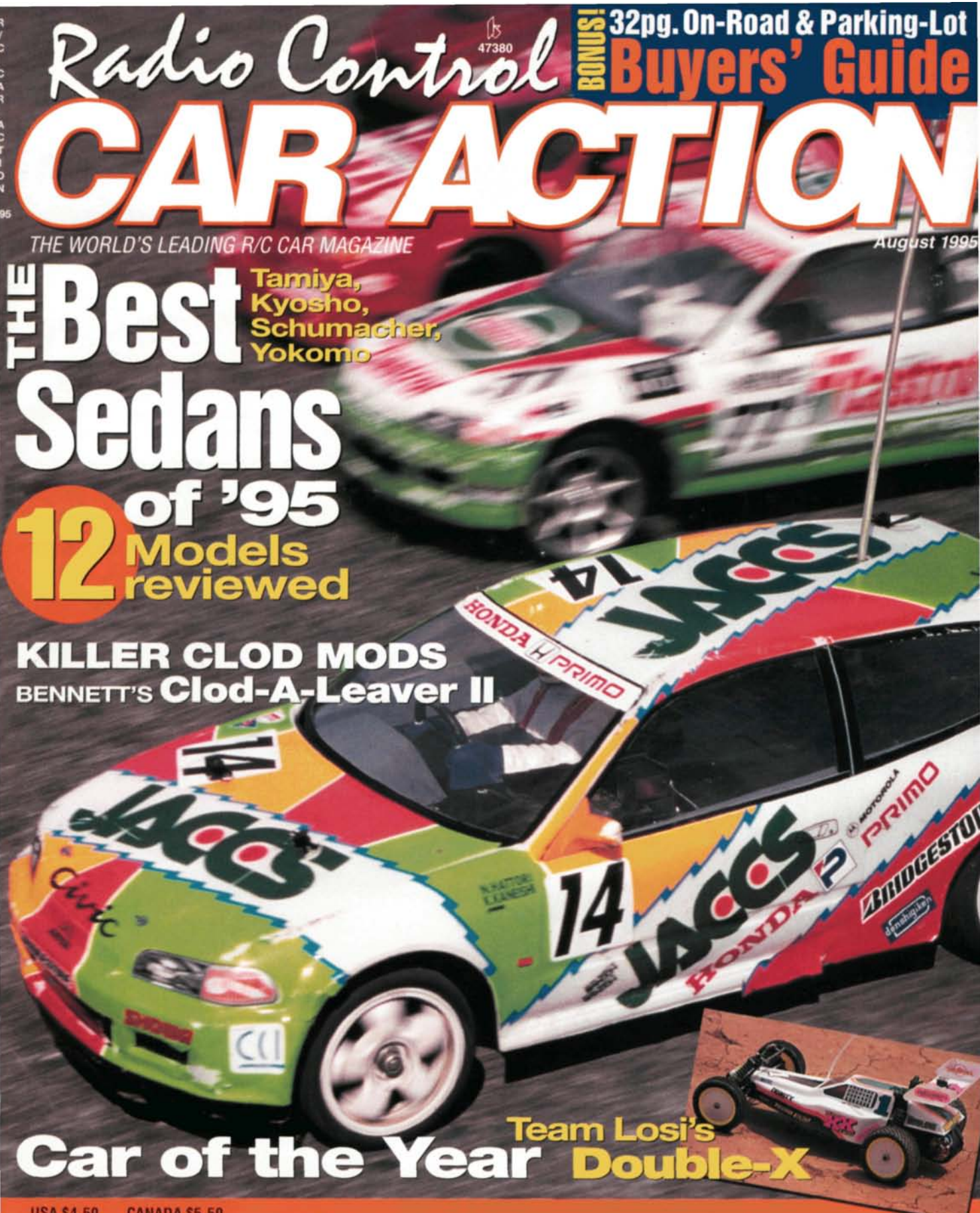
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- Rebuild a Transmission
- Charge and Discharge Batteries





ON THE COVER: photo by John Huber.  
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# Class Separation

**T**o the R/C manufacturer, racing is business, and they'll often pull out all the stops to win, as you or I would under similar circumstances. To this end, the most skilled drivers are recruited to race for the "factory" teams, and they're supplied with the newest and best hardware that the manufacturer has to offer. So the question is: can the un-sponsored driver really compete on equal footing with the factory teams? And if not, should these factory drivers be forced to compete in a separate class?

There are two very strong arguments both for and against a separation of factory drivers from amateurs. Some feel that because factory drivers have access to the best motors and batteries, and because they often use races to test prototype parts that might provide a performance advantage, they shouldn't be allowed to compete against non-factory drivers.

On the other hand, R/C racing, even at the world-championship level, is an amateur sport that offers no prize money; creating a separate "pro" class would be at odds with this. Despite the fact that most amateur racers realize that they have little, if any chance of beating the "hero" drivers, many still relish the chance to share the track with the factory notables.

J.R. Sitman, president of the National Organization for Racing Radio Controlled Autos (NORRCA) fully endorses the creation of a separate class for factory drivers. In fact, NORRCA racing classes have been split into "sportsman" and "factory" divisions for the past three years. "Dividing the classes was a simple decision for us to make," says Sitman. "If you don't have the time to put into racing or have the equipment that they (team drivers) have, you shouldn't have to race against them."

Sitman maintains that the division will help promote the sport of R/C car racing, and that, in effect, the "pro" class will become an exhibition of driving skill and factory technology, while the sportsman class will allow drivers of equal means to compete against one another—and have a better chance to take home a trophy.

Bob Novak, president of Radio Operated Auto Racing (ROAR) offers a different opinion. "One of ROAR's functions is its status as a Worlds qualifier. IFMAR [The International Federation of Model Auto Racing, the organization that sanctions world championship events] is dead-set against money racing, so we have to keep R/C car racing's amateur status."

Novak concedes, however, that a factory class might not be a bad idea, but he sees too many possible problems. "No matter what, most racers want to race against the pros, even though they know they probably won't win." This concern was substantiated by complaints that ROAR received from its members when it chose to divide the off-road Stock and Modified Nationals into separate events. "Some of the members felt that the pro drivers wouldn't show up to the Stock Nats, so the race had less appeal for them," says Novak.

There are good reasons both for and against establishing a factory racing class. R/C racing should evolve with the rest of the hobby. Perhaps the addition of "box-stock" racing classes at major events is in order. If you have an opinion on racing-class separation, send your comments to *R/C Car Action*, 251 Danbury Rd., Wilton, CT 06897 or e-mail [frankm@airage.com](mailto:frankm@airage.com). To voice your opinion to the sanctioning organizations, write to Radio Operated Auto Racing, 30872 Coast Hwy., Ste. 111, Laguna Beach, CA 92677; (714) 494-0515; or to the National Organization for Racing Radio Controlled Autos, 1651 W. Foothill Blvd., Ste. 225, Upland, CA 91786; (909) 944-5381.

  
Frank Masi, Technical Editor  
[frankm@airage.com](mailto:frankm@airage.com)



**The formation of a "factory" racing class would give sportsman racers a better shot at a trophy.**

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## LETTERS

### TOO-FIRM FOAMS

I have a Bolink '91 Sport 2WD. When I drive around on cement, I feel as if I'm driving on ice. When I take off, I spin out. Which tires will give me the best traction on slick, cement surfaces? Thanks a lot for your time.

**TODD GRUNWALD**  
Winfield, IL

Well, Todd, try some foam tires made of a softer compound. Generally, firm tires last longer, but they don't give you as much grip as soft ones do. Also, you might want to check out some foam-tire traction additives such as Trinity's Zip Grip. That might help a bit.

*Doogie*

### TRUCKIN' TRIBULATIONS

Please help! I own an LX-T, and I want to use the Clodzilla racing kit on it. Will it work? If it will, can I still use the DuraTrax LX-T gas conversion kit? Awesome magazine!

**CHRIS CARTER**  
Sacramento, CA

WWWwhoa, Chris! Put the brakes on! I hate to tell you this, but you're way off base on this one. The Clodzilla aftermarket chassis line was designed by ESP Mfg. to fit only the Tamiya Clod Buster and Bullhead monster trucks. There's no way to make it fit your LX-T. And as for the gas conversion kit, you've lost me—big time! If you want to use it on the LX-T as it is now, in stock form, the answer is "Yes." If you're thinking of converting the truck into a Clodzilla LX-T and then converting that into gas,

well, that won't work. Sorry! If you really want a monster, pick up an old Clod Buster or Bullhead, then use the ESP Clodzilla chassis and all the other cool hop-ups that are available for the truck.

*Doogie*

### HE LOVES BIG TRUCKS

I love your magazine, and I especially love your "Project Big Truck" features. In "Project Big Truck, Part 2," (April 1995), John Howell mentions that he used Yokomo 19-turn motors. Are they more powerful than the Trinity Monster Mash motors? What is the most number of teeth that can be used as a pinion for the Clod with Monster Mash motors? Also, a prototype anti-sway bar was used in the same Project; who produces it and can it be used with ESP's Clodzilla II ladder-frame chassis? Any help would be greatly appreciated because I'm now in the middle of making my own project big truck. I hope it's a smash!

**LOUIS LALIDON**  
Sunrise, FL

Hey, Louis, thanks for the praise! As for your questions, well, here goes...

- The Trinity Monster Mash motors are 16-turn singles, and they're faster than the motors I used. The Monster Mash motors have been replaced by Trinity's Speedgems Ruby motors. The Ruby motors come with 0 degrees of timing, so you can toss them right into each gearbox with no mods. You might want to mess with the timing a bit to get more punch out of them though.

- The stock pinion is a 13-tooth gear. You can elongate the motor-mounting slots in the gear cases to allow you to run a larger pinion. Check with Eric Sutcliffe at ESP [(815) 455-5440] for more tips and ideas on this one.

- My prototype sway bar was made by ESP. Once again, check with Eric for price and availability.

Good luck with your project truck!

*Doogie*

### EVEN MORE BIG TRUCK QUESTIONS

Since you have the best mag and more R/C knowledge than all those other cheap mags put together, I just came to you with my questions.

**WRITE TO US!** We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897-3035. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

#### INTERNET ADDRESSES:

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## LETTERS

1. Looking through my latest issue, I noticed that the Tamiya Bullhead and Clod Buster have different prices. I thought they were the same truck with different bodies.  
2. Will the Clod Buster/Bullhead lose the 4WS with the ESP full-race chassis cantilever kit used on the Project Big Truck?  
3. Does the ESP chassis fit the Bullhead?  
4. Will the Bullhead accept the hop-ups from Project Big Truck?  
5. I thought Stormer Racing had Yokomo products, but in my last issue, there were no listings for any Yokomo products.  
6. I've seen Yokomo motors and batteries. Where can I find them?  
Thanks for any help you can give me.  
**ROSS WALLER**  
Lubbock, TX

OK Ross, here's all the help I can give you!

1. You're right in your assumption. Both trucks have basically the same chassis, but they're topped off with different bodies.

2. You can set the truck up for 4WS or front-wheel steering only.

3 and 4. Yes, the Bullhead will accept all the hop-ups I used on Project Big Truck 1 and 2.

5 and 6. If you want to find Yokomo products, contact Ultimate Hobbies at (714) 921-0424.  
Good luck! *Doogie*

## WHERE'S JG?

I own a Tamiya Blackfoot. Looking through your 1989 Buyer's Guide, I came across an ad for JG Manufacturing (page 65). They offered many hop-up parts for the Blackfoot and the Monster Beetle. Is JG still in business? If they are, do you have their address and phone number? If not, do you know where I can get these hop-up parts? Also, is JR servo no. 4735 a metal-gear servo? What is a PCM and what does it do? Thanks.  
**SHERMAN POWELL**  
Detroit, MI

As far as we can tell, Sherm, JG is out of business. We've been trying to get in touch with them for a while, so if anyone knows how, let us know. As for their parts, you might be able to find some of them in hobby shops. Try calling a few shops to see whether they have any stuff left; they just might. The JR servo you mention doesn't have metal gears, but it's extremely fast and strong.

"PCM" refers to a type of coding and decoding used for R/C radio systems. Its main features are the efficient rejection of interference and a fail-safe setting that will return the servos to a predetermined "safe" setting if the transmitter signal is lost. *John*

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## CAR 54, WHERE ARE YOU?

All of you speed demons in Dipolog City, Philippines, better watch out: Danny Chiong's "Raceway Patrol" is on the scene. And judging from his decals, it doesn't look as if he'll be too sympathetic if he catches you. This modified Tamiya Toyota Hi-Lux features a Novak 410 MXc ESC, a Kyosho Mega 12-turn double, complete ball bearings, monster pin-spike tires and a 17T pinion and 77T spur gear, and it's controlled by a Futaba 2PD Magnum radio.

## BEEP! BEEP!

Wile E. Coyote isn't the only one trying to catch a Road Runner™. The guys who race against Jordan Goldberg's road-runnin' RC10 Team Car down in Cedar Grove, NJ, have been eating his dust. Jordan's ride is modified with titanium turnbuckles, an A&L ball-bearing steering bell-crank, a Trinity Slot Machine motor, a Novak 610 RV ESC and NER-2X receiver, and Futaba Magnum Jr. radio gear. What?...nothing from ACME?



## RIP-ROARIN' REPTILE

David Friedlander of Pittsburgh, PA, sent us this photo of the "Snake Bite." This truck is based on a Tamiya Bullhead and has been modified with Trinity Matched Madness motors, a Novak 610RV ESC, a Novak Stutter Stopper and Lexan motor covers. David detailed this ground-pounding machine with working RAM roof lights, an ESP wheelie bar, a Parma Hemi blower unit and a custom paint job.

"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 251 Danbury Rd., Wilton, CT 06897. If we choose your photo, you'll receive a 6-month subscription to Car Action, or an extension of your existing subscription. You'll also be eligible for the fourth annual "Reader's Ride of the Year Contest" in the fall of 1995. Write your address and phone number on your letter and on the back of each photo you send, in case we need to contact you.

## SHINY, HAPPY HEMI

This sparklin' Hemi Coupe comes from Matt Manning of Mesa, AZ. Matt tells us it has a custom chassis underneath the '33 Ford body. Powered by a Slot Machine motor and controlled by a DuraTrax ESC and Futaba radio gear, this coupe can be found drag racing at his local track.



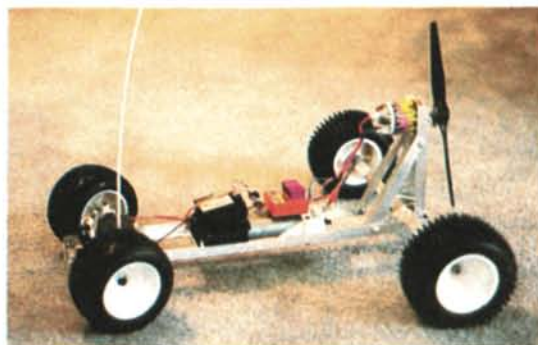


## READERS' rides



### ROYAL R/C

Jeff Bacon, of Lancaster, CA, sends us this photo of his Tenth Technology Predator. This 4WD racer features a carbon-fiber chassis, a carbon-fiber drive shaft, a Reedy Sonic Y 10-turn triple motor, Pro-Line tires, a Tekin 420-G2 ESC, Team Cronos 1700 SCRC cells and a KO Propo FET 1003 servo. Jeff bought the car from an English company, so he thought the British flag paint job would be a nice touch.



### IT'S A BIRD! IT'S A PLANE!... IT'S A CAR?

Nick Treadwell of Marietta, GA, wasn't sure whether he wanted an R/C car or plane, so he built this crazy-looking ride, which gives him the best of both worlds. He built the chassis out of a long piece of angled aluminum and added an RC12 front suspension, a 12-turn motor and a Novak ESC. To finish it off, he hammered a small pinion gear into the prop and secured it with JB Weld. Nick, what we want to know is, how fast does it go?

### DOIN' DOUBLE-DUTY

Frank Pupello Jr. from Tampa, FL, asks, "What does your Bolink Legend car do when it's not at the track?" During the week, his is a



hard-working taxicab that features a working cab light and hauls people (and chickens) all over town. When the week-end comes, the apple-red ride, equipped with two rad surfboards, hits the beach for a day in the sun.



### THE GREAT AMERICAN HERO RIDES AGAIN

This photo comes from Bruce Johnson Jr. of Merritt Island, FL. His radical Traxxas Stampede is powered by a Trinity Speedworks Sapphire 17-turn single and a Trinity pushed 6-cell pack. It's controlled by a Futaba Magnum Jr. whose waves are received by a Dynamite Micro Pro receiver. Bruce tells us that he loves the military, so he customized his Stampede with a G.I. Joe Hummer body—the ultimate in military recon.



In search of fun  
and glory, cause  
life's too short  
to be a sheep • by Chris Chianelli

# INSIDE Scoop



## Die-O-Rama



**A**re you a die-hard F1 racing fan? If you are, are you a die-hard, die-cast fan? OK then, how about this: are you a die-hard F1 fan; a die-hard, die-cast fan; and a die-hard, dyed-in-the-wool "Die Hard" movie fan? All right, now we're gettin' a little carried away. Let's get back to looking at Trinity's new die-cast collectibles; once you see 'em, you'll be dying to get your hands on 'em. (Man, we have got to get over these lame jokes!) Anyway, Trinity has secured the rights to "Racing Grand Stands," which are displays for 1/43-scale F1 cars. So if you own a killer 1/43-scale F1 car, and you're tired of looking

at it on your shelf, one of the four F1 road-racing scenes might be for you (coming soon are stock car and Indy tracks). Also available from Trinity are really cool, 8-inch-tall, cold-cast, porcelain statues of famous racecar drivers that include Nigel Mansell, Ayrton Senna, Michael Schumacher, Jimmy Clark, Graham Hill, Alain Prost and Niki Lauda. For more information, contact Trinity, 1901 E. Linden Ave. #8, Linden, NJ 07036; (908) 862-1705; fax (908) 862-6875.



## Thunderstorm

Tamiya's newest on-road pounder comes in the form of a hot stocker! Based on the stock car sponsored by the Japanese car magazine *Daytona*, this new Tamiya Daytona Thunder stock car has some pretty trick features. A highly detailed stock-car body (manufactured in the U.S. by Parma) rests atop Tamiya's proven rear-wheel drive, group C-class chassis. Power is supplied by a Dyna Tech 01R motor. Other goodies include a three-step mechanical speed control, black, spoked wheels with foam tires and a really trick-looking original-sponsor decal sheet. As you can see, it looks like a pretty zoot ride! We can't wait to get a few so we can bang bumpers with them.

**Contact:**  
Tamiya America Inc.,  
2 Orion, Aliso Viejo,  
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**(800) 826-4922**  
fax (714) 362-2250

**L**eave it to MIP to come up with even cooler trick stuff for gas cars and trucks. Do you want to get rid of some extra heat on your .12 engine's butt? There's no better way than to add MIP's new Buttsink. Simply replace your engine's backplate with the MIP Buttsink and gain lots of extra cooling surface. Like most of MIP's goodies, the Buttsink is anodized purple. Also new from MIP is a pair of new flywheels for the RC10GT in a lightweight aluminum version and a heavier steel version. Both come with four clutch pins, but you can install only two if you use MIP's clutch shoes. For more information, contact MIP (Moore's Ideal Products), 746 E. Edna Pl., Covina, CA 91723; (818) 339-9007; fax (818) 966-2901.



MIP  
Buttsink  
and GT  
Flywheels



## INSIDE scoop



Rockin'  
Wrench

Also new from Trinity this month is the Quad Wrench—a four-way metal wrench that fits the popular 3/16-, 1/4-, 11/32- and 3/8-inch nut sizes. With this handy little wrench, you don't have to worry about fishing around in your toolbox for four different wrenches. Best of all, the wrench retails for \$4.99! For more information, contact Trinity, 1901 E. Linden Ave. #8, Linden NJ 07036; (908) 862-1705; fax (908) 862-6875.



## BoTruck

With the popularity of NAS-TRUCK growing and growing, it didn't take long for Bolink to provide a Legend-type NAS-TRUCK truck for those who want to own one without spending a ton of cash. If you liked their Digger and Legend cars, you'll love their new oval truck, which is aptly named the Super-T! If you want to step up to the next level though, Bolink has a similar truck that comes with a more race-ready design. The truck—the NASTRUCK—comes with a fiberglass chassis, a coil-spring front suspension and a rear pod with damper. Both trucks would be ideal for running in spec-type races. For more information, contact Bolink, 420 Hosea Rd., Lawrenceville, GA 30245; (404) 963-0252; fax (404) 963-7334.

CRC Carpet Knife

A new 1/12-scale threat is creeping up behind you—the Carpet Knife from Calandra Racing Concepts (CRC)! The unique chassis design doesn't use a T-plate for the rear suspension, so the battery pack can be mounted lower and closer to the chassis' center line. So far, team driver Mike Blackstock has won the annual Winter Festival of Racing and the '95 ROAR 4-Cell Nationals. CRC also took the Manufacturer's Cup at the ROAR Nats by placing more cars in the A-Main than any other chassis manufacturer. Right now, conversions are available for any Associated 12L, LW and LS. A full kit with various chassis styles will be out soon. For more information, contact CRC, 6860 Stanwix Ave., Rome, NY 13440; phone/fax (315) 338-0867.



# GET A GRIP.

Gettin' sideways is cool if you're running dirt oval, but if you're racing on carpet or asphalt, it doesn't cut it!

To improve foam tire performance on hard surface tracks, the race team worked with the chemical engineers at Trinity to develop Zip Grip™, a custom, hand blended R/C foam tire traction compound.

Using Zip Grip provides the most precise and repeatable tire performance on carpet or asphalt R/C racing tracks, of any formula available today. And, the new style applicator keeps the Zip Grip on your tires and off your hands.

So if you've been getting entirely too familiar with the turn marshals, it's time to "get a grip" with Zip Grip!

# TRINITY®

1901 E. Linden Avenue, #8, Linden, NJ 07036 ■ 908.862.1705 ■ Fax 908.862.6875





## Shack Attack

Hobby Shack's parking-lot racing series has been so successful that the California-based retailer/manufacturer/distributor has begun to publish its own newsletter. Dedicated to the active parking-lot racer,

Hobby Shack's Race Connection contains late-breaking news on products; hot racing

news from Hobby Shack's own series; and interviews with industry notables.

For information on Hobby Shack's racing series and how to receive the newsletter (and the cool new "Race Connection" decal sheet), contact Hobby Shack,

18480 Bandilier Cir., Fountain Valley, CA 92708; (800) 854-8471. Flash!—138 racers showed up at Hobby Shack's April 23 race at its San Diego location. From 30 entries to 138 in one year—not bad!



## PROTOformula 1

Canada's favorite "body builder," Dale Epp, is at it again with his new, direct-replacement body for all popular 1/10-scale F1 chassis. PROTOform's new Type M body—Dale's version of the '94 McLaren/Peugeot MP4/9—will fit Tamiya, Kyosho and HPI F1 chassis, and it comes complete with separate, molded, turning vanes like those used on full-size cars. The Type M looks best when it's used with any Tamiya driver/helmet figure and the Tamiya Sauber-Mercedes front wing. To find out more about his complete line of bodies, contact Dale at PROTOform, 5455 S. Western Blvd., Hamburg, NY 14075; (905) 646-7638; fax (905) 646-2476. Pssst!—ask him about the '95 Benetton body he's working on!



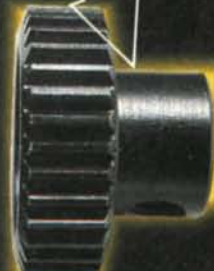
# Zero Gravity™

**Trinity Pinions...**Ours are precision machined from 6061 T-6 aircraft aluminum and teflon impregnated for smooth meshing and minimum friction.

**Trinity Zero Gravity Pinions** Are Super Light!

**Brand "R" Pinions** Are All So Over-Weight, Power is Reduced!

**Brand "R"** ...They have poor tooth finish and profile. They don't mesh well with the spur gear.



**From Magic Motor Sports**

**\$5.99**

In 48 pitch from 12 to 30 teeth • In 64 pitch from 15 to 50 teeth



**We Are Your Source for ALL R/C Racing Needs**

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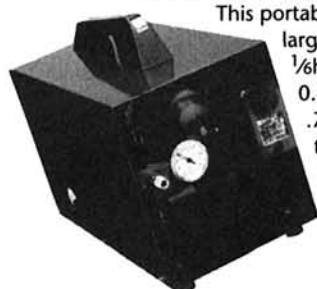


## TRINITY PRODUCTS Stock Car Sticker Sheet

This latest decal release is designed for stock-car or speedway truck bodies. The sheets feature 3-D vents, grills and exhausts. The special fender sticker cluster consists of Trinity-related company logos. To better follow a body's contours, they're all printed in bright colors on a new high-conforming material.

**Part no.—RC9015; price—\$5.99.**  
Trinity Products, 1901 E. Linden Ave., #8,  
Linden, NJ 07036; (908) 862-1705; fax (908)  
862-6875.

## BADGER AIR-BRUSH Million-Air Compressor



This portable compressor provides the power of a larger tank-mounted unit. It's powered by a 1/8hp piston motor, and it comes with a 0.45-gallon (1.70-liter) tank that develops .70cfm at 116psi. It will operate one or two airbrushes at a time.

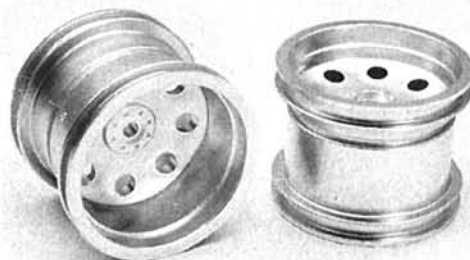
**Part no.—3481-1; price—\$595.**  
Badger Air-Brush Co., 9128 West Belmont Ave.,  
Franklin Park, IL 60131; (708) 678-3104; fax  
(708) 671-4352.



## PARMA 1/10-Scale Renault Laguna Body

This smart-looking sedan has improved aerodynamics and unique styling. Designed to fit 1/10-scale, on-road gas cars as well as electric off-road chassis, this body will transform your vehicle into a potent racing machine.

**Part no.—10394; price—\$21.**  
Parma Intl. Inc., 13927 Progress Pkwy., North Royalton, OH 44133; (216)  
237-8650; fax (216) 237-6333.



## TRAXXAS Satin-Chrome Wheels

Dress up your Rustler or Stampede with these new, show-stopping wheels. They're made out of durable nylon, but have the look and feel of real brushed aluminum. Most popular racing and monster truck tires will fit these 2.2-inch-diameter wheels.

**Part nos.—3672 (rear wheels); 3673 (front wheels); price—\$6/pair.**  
Traxxas Corp., 12150 Shiloh Rd. #120, Dallas, TX 75228; (214) 613-3300;  
fax (214) 613-3599.



## MRC MSP-9 World Scale™ Off-Road Tires

These 1/10-scale tires are made out of a special natural rubber compound and feature an aggressive, multi-step-pin tread pattern. This new design offers superior handling characteristics on both soft- and hard-packed track surfaces and can be used with or without foam inserts, which customize steering and handling.

**Part no.—9627006; price—\$18.**  
MRC, 200 Carter Dr., P.O. Box 267, Edison, NJ 08818; (908)  
248-0400; fax (908) 248-0970.

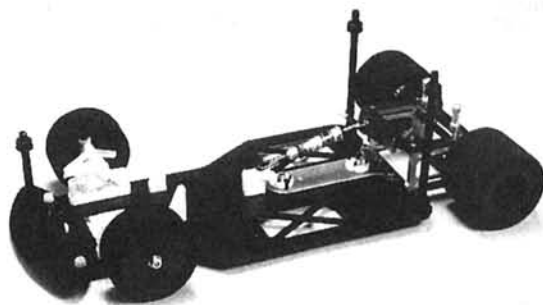
## MOTOR MAN Pro Series Modified Motors

These motors are based on the new Epic modified can. They feature super-thick 5.1 magnets and a full can for awesome horsepower,



and they're available in a variety of winds.

**Part no.—MM2XXX; price—\$85.**  
Motor Man, 8950 Osage Ave.,  
Sacramento, CA 95828; (916)  
381-7491.



## BOLINK LTO® XL

This new superspeedway oval racer features a T-plate rear suspension with a single shock and damper tube; a machined, aluminum-and-graphite rear end; and an Associated "Dynamic Strut" front end suspension. The kit is available with tires, body and wing, or as a basic chassis kit.

**Part nos. and prices—BL-1386, complete kit, \$299.95; BL-1386-C, chassis kit, \$199.95.**  
Bolink R/C Cars Inc., 420 Hosea Rd., Lawrenceville, GA 30245; (404) 963-  
0252; fax (404) 963-7334.





## TRUBLE SHOOTING

by John Huber

### BEATING THE BIG DOGS

I have an RC10LS that's modified with a Tekin G-12 speed control; Futaba 1024 PCM and FP-S132H servo; titanium axle; Extreme Motorworks Smoke-2 motor; Jaco 1 1/2-inch pink rears (reds up front); and Sanyo SCRC 1700s loaded all on the left for oval. I use a Super-IQ and follow strict battery maintenance; for that matter,

I'm a maintenance freak. I hard-wire everything!

I run Robinson 48-pitch pinions with silencer spurs. The "big dogs" at my local track say about 3.80 is the ratio to run, and I've tried to gear my car in that area (I'm at 3.857 with a 21 pinion and an 81 spur). My problem is that I try all the trick stuff the big dogs use, and I'm still off the pace by a full three laps. That's right, three:

count them, 1-2-3. This is severely disappointing. Is there something I missed? By the way, I'm racing 1/10 oval on a short track (unbanked asphalt). I have plenty of battery left at the end of 4 minutes; probably about two or three laps. My car weighs 45 ounces, which is off the track average by about 1.5 ounces. Please help!  
**RICK THOMPSON**  
Boerne, TX

It sounds as though you have the goods you need to do well. What you might lack is practice. Take a look at the lap times of your competitors and compare them with yours. If their lap times are consistently the same or close, and yours fluctuate, it's just a matter of you practicing more. If you have battery time left

*If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at Radio Control Car Action, and we'll see if we can chase down an answer for you.*

*Questions should be of a technical nature and should be addressed to Troubleshooting, Radio Control Car Action, 251 Danbury Road, Wilton CT 06897. We regret that, owing to the tremendous number of letters we receive, we can't respond to every one.*

at the end of the run, you might want to gear up a tooth. This way, you'll be slightly faster (which is always nice), and you might be able to pick up a few laps. The other thing you should consider is your tire diameters. They'll have an effect on your gearing (each revolution of the wheels will move the car a certain distance), and they shouldn't be overlooked.



### OUTLAW ON THE RUN

Help! I have an Outlaw Rampage with a .12 CZ-R engine, and something is terribly wrong. Every time I push the throttle, it always seems to stick. The only way to stop it is to use the brakes. I've done everything to get the stubborn truck to work correctly. I took off the air filter (not when the truck was running, of course) to see what was hanging up. Nothing seems to be the problem, except when the engine turns over. That's when I have to chase after it.

The second problem? When the truck is running, there's usually a delay when I give the car a command. For example, if I want the brake to go on, it takes about 2 seconds for the truck to respond. I use a 2-channel Airtronics Rival sport. I

always keep the batteries full. I would appreciate it if you could help me. By the way, nice mag.  
**NATHAN KAY**  
Clifton, VA

It sounds as though you have a radio problem caused by interference when the engine is running. To be sure, install a fresh set of batteries in the car and transmitter. Have a friend help you do a

range check. Have him carry the car (not running) about 50 feet away, and then try the steering and throttle. Do the same thing with the transmitter's antenna down. You shouldn't have problems with operation, and there shouldn't be any delay in the controls. If there is, send the radio back to Airtronics for a check. If

everything seems OK, start the car and do the same thing. Make sure you don't let the engine rev too much while it's in the air! If the problem shows up now, you need to find the source. Radio interference when the car is running is usually caused by two pieces of metal that are barely touching. As the engine creates vibration, the rubbing metal pieces cause radio interference. First, make sure the header isn't touching the pipe and that there's at least a 1/4-inch gap between the two. After this, just check everything that looks like it could cause a problem. Sometimes it's very difficult to find the source, but be patient. By the way, did you ever get fuel in your receiver? If so, it may have damaged it.





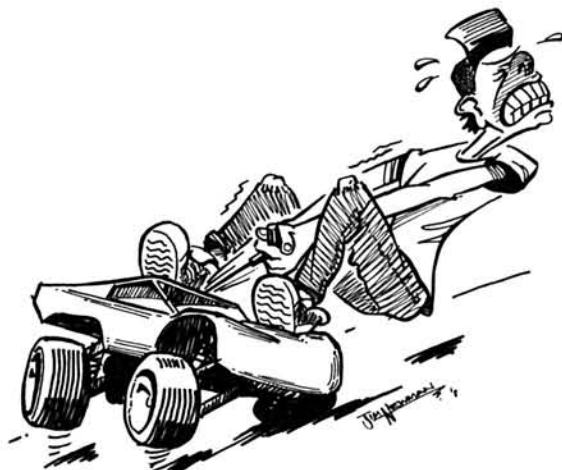


## THE GREAT FLOOD

About a year ago, I bought a Traxxas Nitro Hawk (no hop-ups). With an Image .12 engine and 10-percent Cool Power fuel, it ran perfectly for about six runs. After that, it wouldn't start. I followed all the correct break-in procedures, but it felt as if something was obstructing the pull-starter (it felt jerky). My father and I took the pull-starter apart, and nothing seemed to be wrong with it. Having put everything back together, we tried to start the engine. It started, but then it choked out. We tried to start it again, but every time we pulled the pull-starter string, it was harder to pull (as if something was rubbing against the sleeve, or the piston was too big for the sleeve).

We let it sit for a day and then tried again, but it did the same thing. We adjusted the high- and low-speed mixtures and the idle speed, then we tried to restart it, but no luck. We read the booklet many times and tried the same procedures; nothing worked. I haven't run even ¼ gallon of fuel through it yet, so I don't think the problem lies in the piston and sleeve (or maybe it does?). In your great magazine, I've read about other people having similar problems. Please help! Also, the coil spring for my pull-starter broke twice, and I had to fix it. I don't want to buy a new engine! Is there an alternative to a pull-starter?

JARRED LYONS  
Wurtsboro, NY



Your engine is flooded; there's too much fuel in the combustion chamber. When the piston rises and tries to compress the fluid, you feel the resistance. To clear the engine, remove the glow plug and invert your model. A couple of quick pulls on the cord should force any fuel in the engine right out. Although this will clear the fuel, it won't prevent it from happening again in the future. Either your

low or high end is too rich and needs to be adjusted. Turn the low-end needle in ¼ turn and see whether that helps. If the engine shows signs of flooding, remove the plug and clear out the fuel before you break another pull-starter spring. And if you want another way to start your engine, read Johnny B's article on the Dynamite Starter Box in the July '95 issue (or have you already read it?).

## CLUTCH-A-GO-GO

A few weeks ago, I bought a used RC10GT in extremely good condition. Just to get to know the truck a little better and to make future adjustments less complicated, I decided to remove the clutch-bell assembly and take a look at the clutch. I found that there's no clutch spring. Also, about ¼ inch of the end of each shoe has been removed. Have you

ever heard of racers doing this? Should I leave the clutch this way or buy a new one? Would the clutch made by MIP be a good choice? Any info would be greatly appreciated.

NATHAN CUNNINGHAM  
Placerville, CA

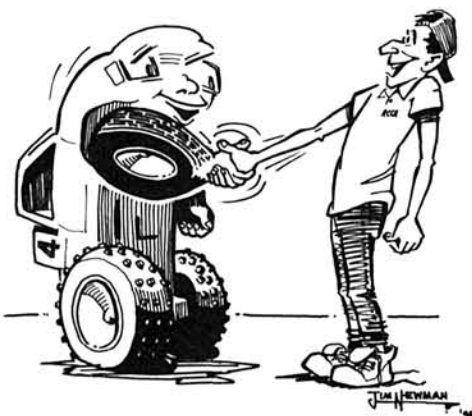
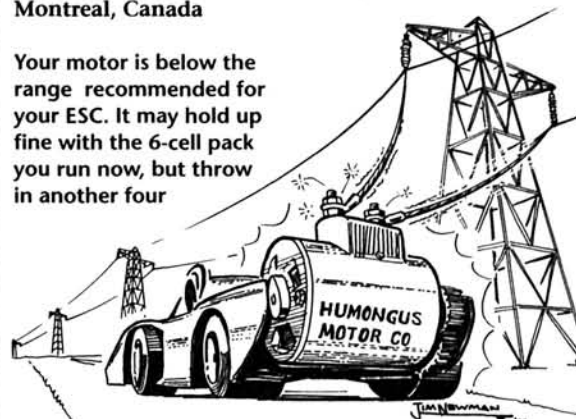
The clutch on your GT sounds as if it has been set up correctly. The first versions of the truck had a spring on the clutch shoes, but the spring was later removed to improve performance. The shoes were cut to let the engine rev a little more before the clutch engages, and they're probably fine just as they are. If you do need new clutch shoes, the MIP units are a good deal because they can be configured in four ways to suit your needs.

## FRY DADDY

I want to build an insane ride. I own an RC10L with bearings and a 13x3 motor, and I have a Novak 610HRV ESC. The ESC's instructions say that you can run six to 10 cells and a motor with 17 turns, but not fewer than that. Can I use 10 cells without burning the ESC? By the way, what is a voltage spike? I feel the need—the need for speed! MICHEL VACHON  
Montreal, Canada

cells, and you'll probably fry your ESC. If the instructions give you a range of motors and cells to use, you should stick to them. If you want to go crazy with the power, try the Hammer Pro or the 828-HV ESC. A voltage spike is a momentary increase in voltage that has a very sharp attack and decay. It appears on an oscilloscope as a vertical spike, hence its name.

Your motor is below the range recommended for your ESC. It may hold up fine with the 6-cell pack you run now, but throw in another four

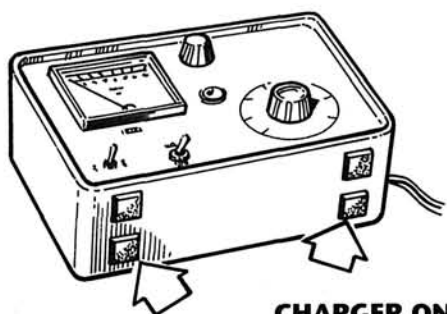






## PIT TIPS

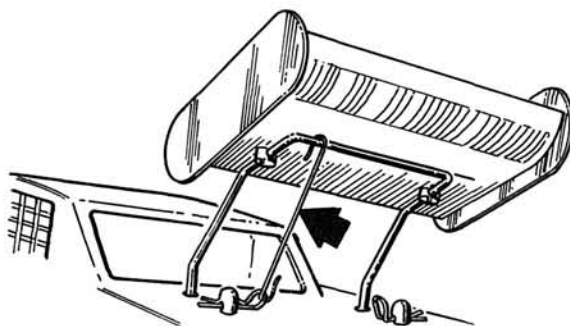
by Jim Newman



### CHARGER ON ITS FEET

Because your charger is invariably placed upright so that you can read its meter better, stick Radio Shack rubber pads to the bottom of the case. This will protect the bottom of the case and prevent the unit from sliding around.

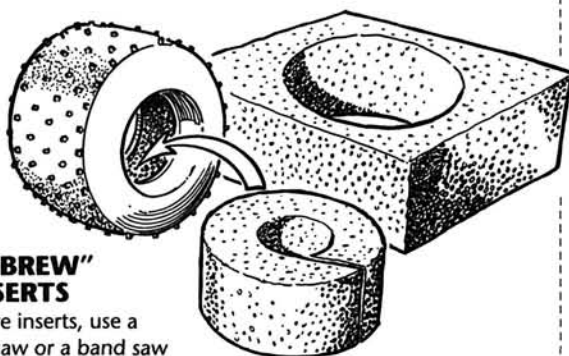
*Marbenn Cayetano, Harker Heights, TX*



### WING RETAINER

To prevent wing wires from coming out of the holes, bend a paper clip or piece of thin wire, and hook it over the wing wire and around the body clip. A couple of thin rubber bands will serve the same purpose.

*Andrew Miller, Union, KY*



### "HOME BREW" TIRE INSERTS

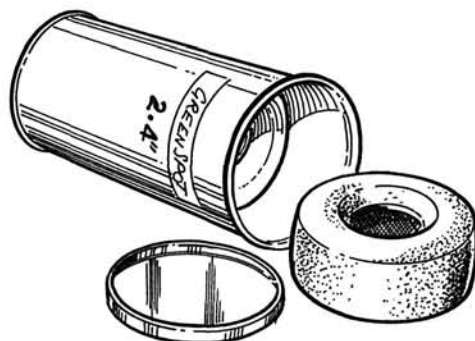
To make tire inserts, use a Dremel jigsaw or a band saw to cut strips or donuts out of sheets of  $\frac{3}{8}$ -inch (9mm) carpet foam. Before you insert the donuts into the tires, trim the shoulders with shears to round them off.

*Joel Carlson, Raymond, MT*

### CHIPS OUT—TIRES IN

To keep your tires fresh, store them in a clean, empty Pringles potato-chip can.

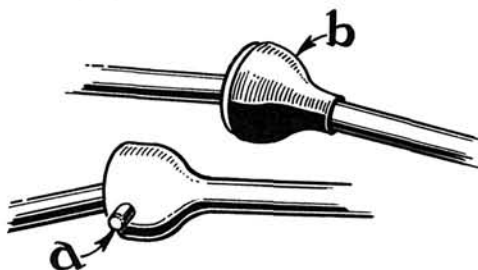
*Dave Scantland, Frankfort, IN*



### KEEPING THE PINS IN

To prevent the cross pins from backing out of your CVDs (a), apply a band of heat-shrink tube around each one (b).

*Chris Dilschneider, Calgary, Alberta, Canada*

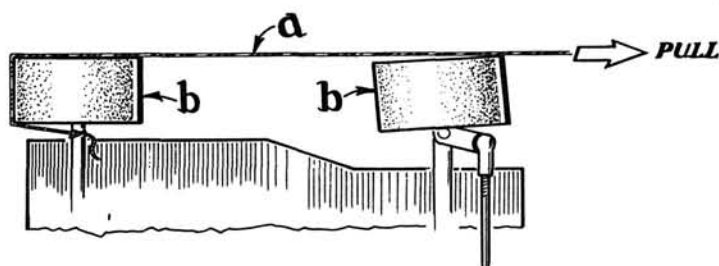


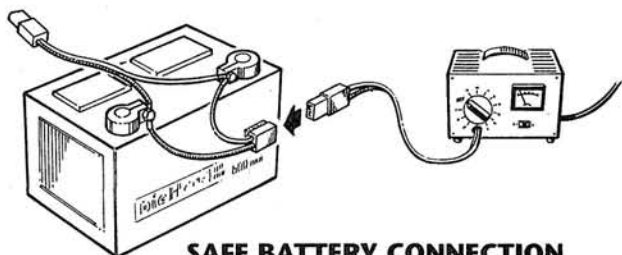
**Attention:** In the June 1995 issue, we published a pit tip sent in by Quan Rusk from Australia. Quan, we're sorry, but we have misplaced your address. Please call us at (203) 834-2342, or write to us so that we can send you your complimentary subscription.

### ALIGNMENT BY CORD

Make sure the servo is centered, then stretch a thin cord (a) along the wheels (b) at hub height, as shown. Now you'll be able to adjust the ball joints to bring the wheels into alignment. This works only if the front and rear tire widths are the same.

*Fr. Edwin Lazaro, Manila, Philippines*





### SAFE BATTERY CONNECTION

To eliminate the danger created by alligator clips popping off your full-size car battery, permanently connect 18-inch-long charger leads to the battery and, on the ends of the leads, put plugs that will match the Ni-Cd charger.

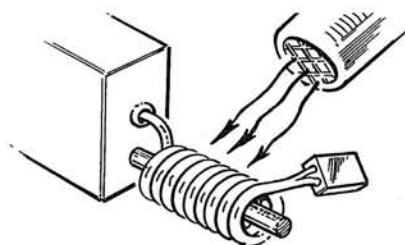
*Joe Allen, Eugene, OR*



### TACKY DIRT COLLECTOR

To prevent dirt from getting into the gear teeth, smear the inside of the spur gear cover with grease. Clean the cover regularly, and re-coat it with grease.

*Mike Rommel, Prince George, BC, Canada*



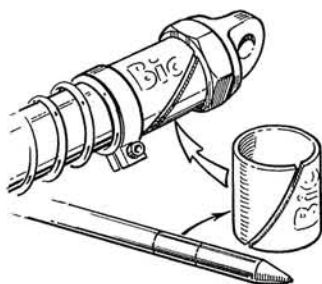
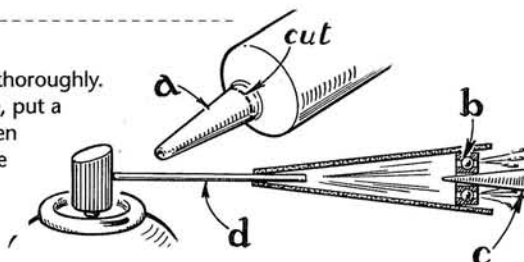
### CURLY LEADS

To keep servo and ESC leads tidy, wind them around a dowel or a toothpick, and carefully warm them with a hair dryer. Keep them twisted until they cool so that they'll retain their curliness.

### CHEAP BEARING CLEANER

Cut the nozzle (a) off an empty tube of caulk, and clean it thoroughly. Force the dirty bearing (b) into the wide end of the nozzle, put a wooden plug (c) in the center hole of the bearing, and then force the bearing cleaner tube (d) into the small end of the caulk nozzle. Spray away while twisting the bearing back and forth.

*Danny Gosney, Collinsville, OK*



### BALLPOINT SHOCK COLLAR

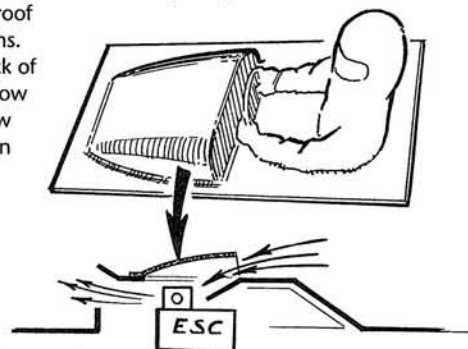
Cut collars off empty ballpoint pen bodies, slit them diagonally as shown, and snap them over the shock body (if necessary, retain them with a piece of tape).

*Jonathan Ricafrente, Carson, CA*

### RC10 ESC COOLING

On the Championship Edition RC10, separate the dashboard from the molded driver, cut away the gauges, then glue the dashboard over an opening that's cut in the roof above the ESC fins. Open up the back of the cockpit to allow the hot air to flow through as shown in the side-view cutaway.

*Garrit Winge, Donaldson, MN*



*Radio Control Car Action* will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o *Radio Control Car Action*, 251 Danbury Rd., Wilton, CT 06897-3035. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.





## Sway-Bar Secrets

**S**ome people call them sway bars; others refer to them as anti-roll bars. A third segment of the R/C world simply splits the difference and calls them anti-sway bars. What are these things, and how do they work? If you're wondering whether you should have one of these contraptions hanging off the front or rear suspension of your car, read on. The Doctor will make it all clear for you.

- **What they are.** To begin with, whether you call them anti-roll bars or sway bars makes very little difference, because what we use on R/C cars and trucks is really a type of torsion bar. It's a tuning aid that allows you to adjust suspension spring resistance a little at a time, and it can be very useful when you have your car more or less dialed in to a particular track.

- **How they work.** They work like this: the front or rear suspensions on

**This is your basic sway-bar setup. Each end of the bar has an adjustable link to mount it on the chassis or suspension arm. The center portion is fastened to the rear pod or shock tower. The longer the lever, the softer the action. This is a 0.078-inch-thick bar, so it will provide softer action for a bumpier track.**

each side of the car are connected—through a series of links, guides and standoffs—with a section of music wire that's bent, usually in a U-shape, to avoid interfering with other components. The bottom portion of the U-shape is held on the rear pod or shock tower. The legs are

secured to the chassis or A-arms and act as levers that twist the torsion bar.

- **Flexibility.** Pan cars with solid rear axles can use sway bars (let's call them that for now, shall we?) instead of tweak screws to provide both static tweak settings and resistance to the rear pod's side-to-side move-

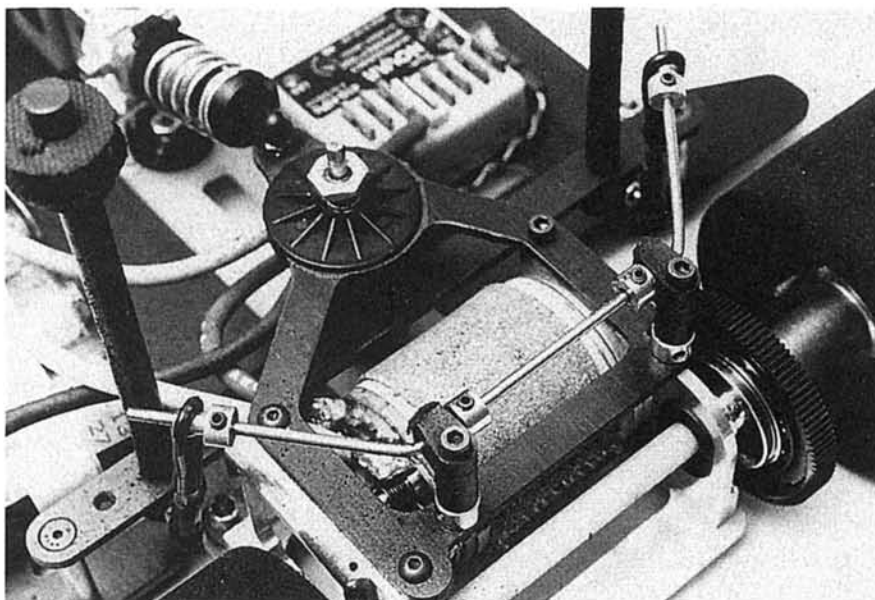
ment. Whether the car has a flex-plate or a trailing-link design, there's still only a single pivot plane for which the bar can compensate. Look at the rear of a pan car when the tweak screws are removed, and flop the pod from side to side. Note that you can't raise one side without lowering the opposite side by the same amount. Do you want to increase side-pod movement without affecting traction, such as on a slippery oval track? A sway bar is your best bet; it separates the rear pod's two actions (fore-and-aft and side-to-side), and it allows you to tune one action without affecting the other.

- **Width.** I've seen both wide and narrow sway bars on pan cars, mostly on the oval. Wider bars have longer levers and give less resistance, even when made of a thick wire. Narrow bars have shorter lever arms and a sharper angle at the torsion pivot, and they generally provide greater resistance, even when made of a thinner wire.

- **Tuning.** When tuning the sway bar on a solid-axle chassis, you have two options, assuming you don't change the bar's thickness. If you want more resistance on either end, move the linkage that's attached to the end you want to change closer to the pivot point, where the bar is bent. Conversely, you'll get a softer ride if you move the linkage end farther away from the pivot point. Tweak is achieved by adjusting the turn-buckle segment of the linkage. Make the linkage longer, and more weight



**This is a short, 0.093-inch-thick bar mounted on an Associated 10LSS. It limits the side-to-side action of the rear pod, but it doesn't affect the front-to-rear action at all. This makes the car very stable at high speeds on a fairly smooth, banked carpet oval.**



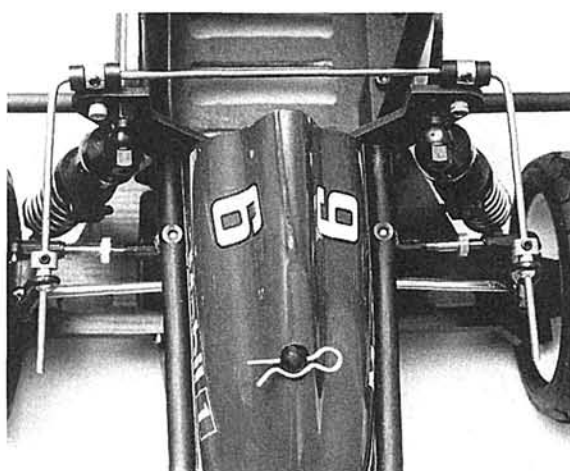
will be transferred to the front tire on that side of the car as well as to the rear tire on the opposite side of the pod.

• **Installation.** If you install a sway bar on an oval car, for instance, begin with the right-side linkage a couple of millimeters longer than the left-side link. That will result in more weight being shifted to the right front tire (remember wedge?; left rear crosses to right front). With all the batteries on the left, most cars handle better when the weight is evenly distributed across the front end, especially on banked oval tracks. Be aware, however, that too much right-side weight in the front will cause bad push.

When sway bars are used on cars with independent suspension, you have to deal with multiple-pivot planes. Unlike in pan cars, the suspension action of one side of the chassis is independent of the other (unless you tie them together somehow). When a parking-lot sedan car enters a turn, the suspension on the outside of the turn is compressed. The natural tendency of the chassis is to rise up on the inside, and that makes the body lean away from the inside of the turn. This is not a good thing.

You can correct this tendency by connecting the front or rear suspensions on both sides of the chassis. When the outside of the suspension is compressed, the sway bar will cause the inside suspension to be compressed as well (although to a lesser degree). The amount that the suspension on the opposite side is compressed is proportional to the thickness of the sway

bar, the location of the pivot points and the length of the levers that are provided by the legs of the bar. Just as on a pan car, the longer the legs, the softer the reac-



**The Quarterflash\* sway bars mounted on this Outlaw sprint car allow the tuner to adjust the traction at each corner a little at a time. I dropped almost 1 full second per lap using these bars! If you want to go fast, you have to be willing to experiment.**

tion. Move the links closer to where the wire is bent, and the suspension arms move almost in tandem. Move the links as far away as they will go, and there's virtually no reaction at all!

### SWAYIN' APPLICATIONS

• **Off-road.** It's becoming popular to put sway bars on off-road cars and trucks again, too. This isn't a new idea; as early as 1985, the original RC10 had a sway bar included in the box! It still makes sense. On certain tracks, limiting chassis roll without resorting to extreme camber changes is an excellent way to tune the suspension. It's also a great way to remove traction from one end or the other a little at a time if the car pushes or is too loose.

• **Traction.** Dirt-oval and sprint-car guys use sway

bars all the time. That's because the fastest way to get around a clay oval is to slide just a little all the way around the turns. Sway bars allow them to increase or decrease trac-

tion a little at a time at each corner (when a change in shock fluid or shock springs would be too drastic).

Should you put a sway bar on your car or truck? That depends. If you think you understand how your car's suspension works, it's certainly worth a try. Sway bars give you a subtlety in tuning that shocks and springs simply can't supply. Don't expect to go any faster right away. Your car may, in fact, take on some unusual handling traits until you figure out how the bar is supposed to be adjusted. Think of it as just another weapon in your tuning arsenal. It may help you in one particular racing battle, but it won't win the war for you.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 200. ■



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## Futaba MC310CB

The folks at RC Hobbies—a hobby shop in Huntsville, AL—plan to run a spec-class race using the MRC MT-10S 1/10-scale truck. I've always wanted to play around with such an electric truck, so I asked the *R/C Car Action* staff what was available. They found me a ready-to-run version of the MT-10S.

When I received the MT-10S, it still had the stock mechanical speed controller, so I test-ran it. Right out of the gate, I had trouble. The MT-10S ran at partial throttle, but when I jammed the throttle to the floor, the truck stopped. The problem was a dirty/burnt contact in the control switch. The MRC mechanical controller isn't sealed, and dirt and arcing had "done in" one of the contacts.

But I had an electronic speed control (ESC)—Futaba's\* reversing-style MC310CB—just waiting to be tested. I was eager to get on with the fun.

### TROL TESTS!

After much prying with an X-Acto knife and poking with a small screw-

driver, I managed to remove the case without damaging the MC310CB. Inside, I found bright, shiny solder joints. Most of the parts are mounted on the top of the board, and the "etch" that carries the motor current is massive. In short: good engineering and careful assembly—exactly what you'd expect from Futaba.

### • Test 1—Resistance

Low "on" resistance is one of an ESC's most important features. To perform as well as they do, our R/C cars burn more than 20 amps, and at this current, the slightest resistance means a huge power loss and an overheated ESC.

With 12 amps of current flowing, I measure the voltage drop across the ESC and then calculate its resistance by dividing the measured voltage drop by 12. I measure resistance twice—along the full length of the motor wires and battery wires (including connectors) and 2 inches along them. The first reading helps me to determine an ESC's "on" resistance as it comes from the factory, and the second gives a standard reading with which I compare ESCs.

### • Results

*Voltage drop along full length of wires:* 0.32 volt—a resistance of 0.0266 ohm.

*Voltage drop 2 inches along the wires:* 0.21 volt—a resistance of 0.0175 ohm.

These are reasonably low resistance figures for a reversing ESC, especially considering that the



### MC310CB

also has a fuse built into its power line.

Reversing ESCs have higher resistance than forward-only-with-brakes racing-style controllers. To achieve reverse, it's necessary to reverse the polarity of the voltage applied to the motor. To do this, it is necessary to divide the power-handling transistors—FETs—into four groups. These groups make a two-way bridge that can route the battery voltage in either direction to the motor. This grouping of the FETs means that fewer are wired in parallel, and a higher resistance is the result.

How does Futaba achieve this relatively low resistance? To handle the current, they use massive etch on the printed-circuit board. But the real trick is the grouping of the FETs. The two forward-current groups both have four FETs. This places the lion's share of FETs in parallel to handle forward current. I didn't measure it, but I suspect that this means a high reverse resistance (of little concern because reverse isn't really needed for high-speed running).

### • Test 2—Heat

I "cook" every controller I test by adjusting the resistor bank to pass 20 amps of current, jamming the throttle wide open and running the ESC for 15 minutes while it pumps a hefty 20 amps (no fans allowed). I did have the factory-installed heat sink in place.

### • Results

After 15 minutes, the MC310CB's heat sink was too hot to touch comfortably for more than 1/2 second. According to the instruction sheet, the MC310CB has built-in automatic thermal shutdown, but it didn't kick in, so the MC310CB was obviously still well within safe operating limits; in fact, it was still operating normally at the end of this test.

### • Test 3—Dead short

In my dead-short test, I check to see whether an ESC could survive the heavy current it would have to withstand if a gear jammed or the motor fried.

I connected a fully charged 6-cell battery pack to the battery leads and a dead short across the motor leads. I jammed the throttle wide open and the fuse went "poof." Fuses aren't recommended for racing because they "rob power," but they're great in a reversing ESC that's intended for backyard jamming.

Most of us operate on a limited budget, and a fuse is much cheaper to replace than a controller; and that's where I had my only real problem with the MC310CB—replacing the blown fuse. It's recessed flush with the top of the case and fits very tightly in its socket, so it was a bear to remove. I pried it part of the way out with a screwdriver and then grabbed it with

### WHAT IT HAS

- 1-second delay between forward and reverse, during which time the MC310CB will apply brakes as you advance the trigger toward reverse. This reduces the chance of that gear-stripping damage that occurs when you slam from forward into reverse.
- Massive heat sink and a 35A fuse;
- Battery and motor connectors (complete set);
- 10 FETs—two groups of four handle forward current; two handle reverse;
- Automatic thermal shutdown.



needle-nose pliers. The good news is that it's a standard automotive fuse and can be bought at any gas station or department store auto department.

## SPECIFICATIONS

### DIMENSIONS

Height	1.26 in.
Width	1.79 in.
Length	1.63 in.
Weight	2.9 oz.
Access to controls	Good
Ease of adjustment	Fair
Warranty	180 days

### ELECTRICAL

(manufacturer's specs)

Max. voltage (7 cells)	8.4 volts
Min. voltage (6 cells)	7.2 volts
Max current forward (Fuse Current)	30 amps
Resistance	0.0205 ohm

### TEST PARAMETERS

Voltage	6 volts
Current	12 amps
Voltage drop	
—along length of wires	0.32 volt
—2 inches along wires	0.21 volt
Resistance	
—along length of wires	0.0266 ohm
—2 inches along wires	0.0175 ohm

### LIST PRICE

\$109.95

**COMMENTS:** this is a good, inexpensive replacement for the pesky mechanical controllers you find in most backyard buggies. The big news is that it has a built-in 30A fuse to protect it against burn-out caused by overgearing, shorting or a burnt-out motor. Any one of these is bad enough, without losing an ESC in the process. It has fairly low resistance for a reversing ESC. Braking is strong, and reverse is adequate to get you out of trouble. Forward performance was great—good acceleration and top end.

## TROL A TRUCK!

While I was installing the MC310CB in my MT-10S, I decided to add a few trick items to the truck. I replaced the plastic bushings with a full set of ball bearings (not cheap, but considering the number of bearings and the difference they make to the truck's performance, they're well worth the cost). A Green Machine 2 stock motor came next. It has a slotted armature and laydown brushes, so I knew it would be a hot performer, even with the stock gearing. I was expecting great performance!

Mounting the MC310CB was a little difficult, because the MT-10S's molded chassis doesn't have a lot of flat space to take a controller. I could have mounted it on the rear shock tower, but it has a big, square, weight-reducing hole cut in it. Instead, I cut a thin, flat piece of aluminum to size, bent up one edge and drilled a couple of holes in the bent part. I then bolted the piece of aluminum to the shock tower (where the old mechanical controller had been), using the two bolts that are used to secure the transmission to the tower, and I mounted the ESC on it. Mounted in this position, the ESC's

heat sink is aligned with the hole in the shock tower, so it's well-supplied with cooling air.

The MC310CB came with a full set of connectors installed, so it was easy to install and adjust. The usual two potentiometers (pots) are used to match the ESC to the transmitter; the first adjusts neutral and the second adjusts full throttle (a procedure that's fully covered in the well-written instructions).

With the truck set up and running, I headed to the local track for a test run. Right from the start, it was evident that the MC310CB was a good match for the MT-10S, and it was definitely a step up from the mechanical unit that it replaced.

The track was dry and slippery, and my driving skills are limited, but I kept the MT-10S on the track most of the time (well, maybe some of the time!). At the track were three drivers running their pride-and-joy entry-level cars, and I let them try my truck. They all had a blast! In fact, we all had fun and the MC310CB performed well.

On another day, I ran the truck through several battery packs in the parking lot where I work. Without exception, run times were good,

acceleration was crisp, and the brakes were strong. All this, plus having reverse—great when a driving error got my truck in trouble—made for one enjoyable lunch hour. After each run, the MC310CB's heat sinks were only a little warm—as expected, because of the reasonably low resistance, 8-minute run times and the cooling air going to the heat sinks.

## CONCLUSION

For a reversing ESC, the MC310CB has reasonably low resistance; because of this, I didn't have any overheating problems with the controller mounted in my truck. My setup has a stock motor and fairly mild gearing, but I'm sure that the MC310CB could handle a modified motor geared for a 6-minute dump. But the MC310CB really shines as a moderately priced replacement for a trashed mechanical controller.

If you're vacant-lot racing with your buddies, the MC310CB may well be the secret weapon you've been looking for. At a minimum, its reliability will keep you running instead of fixing.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 200. ■

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ALUM. SKID PLATE (fit's lower bumper)	\$10.95





Kyosho

# GP-20 Esprit 4WD

by Jonathan Biebesheimer

**I**S BIGGER BETTER? I asked myself this question when I got my hands on the kit for the new Kyosho\* GP-20 Esprit 4WD 1/8-scale gas car. The box was big; that was cool. The box for the body was even bigger; that was cool, too. I opened the box and found that all the parts were huge—really cool!

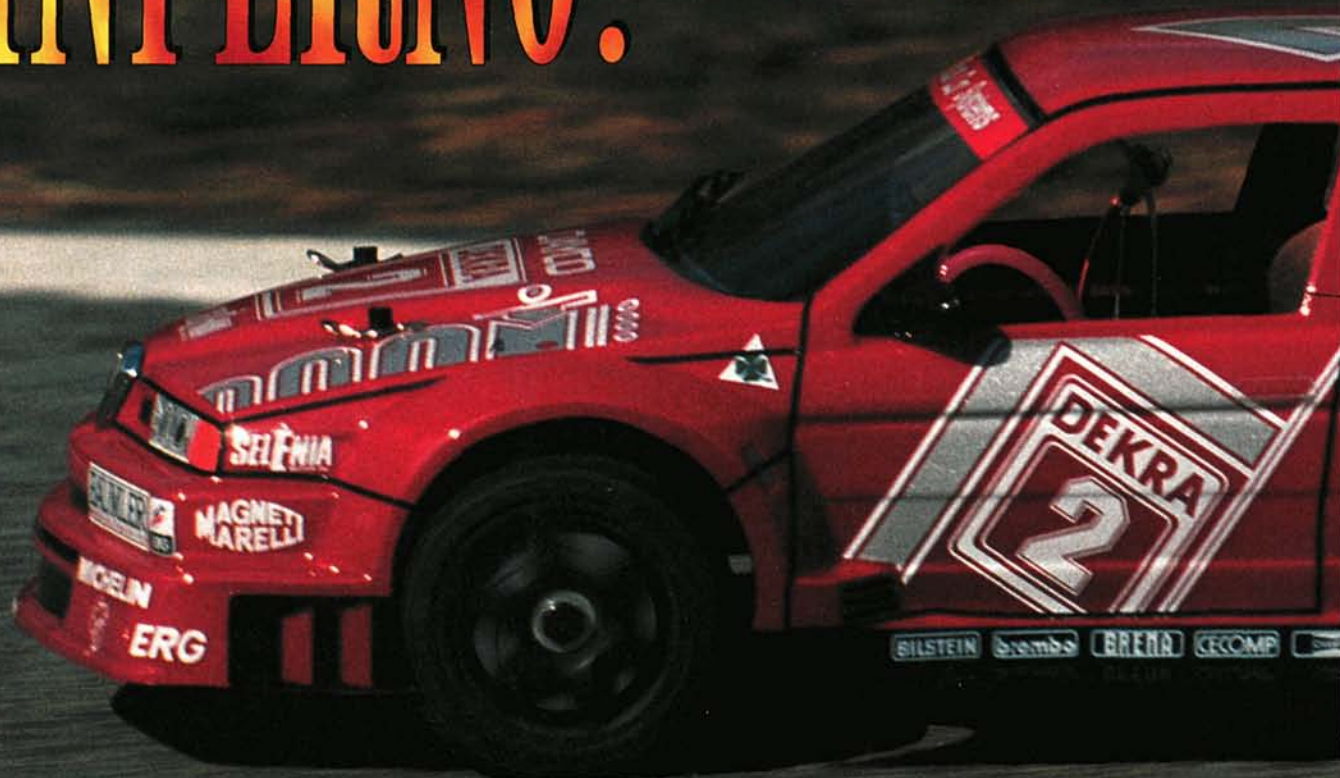
And the car required a big .21 engine. The warning on

the cover of the instructions read, "This R/C model is not a toy! It's designed for maximum performance!"

Everything I saw suggested that this big car (which is rumored to roar to speeds of over 50mph) would be one sick vehicle when it was finished. But until then, I wouldn't really know, so determined to see what the world of 1/8-scale racing held in store, I launched into the construction with visions of burning rubber in my brain.

*four-door*

# INFERNO!





## KIT FEATURES

The GP-20 isn't Kyosho's only 1/8-scale design. For several years, Kyosho's Inferno has been one of the top contenders in 1/8-scale off-roading. I investigated and found out that, except for a few changes that improve on-road performance, the GP-20 is practically identical to its off-road counterpart, the Inferno. In fact, for less than \$100, you can buy an Esprit 4WD conversion kit that will convert any Inferno model into the GP-20. Both cars have a full-time 4WD power train and a thick, duralumin pan-style chassis, which is packed to the limit!

In the GP-20, the required .21 engine and the 125cc gas tank monopolize a good portion of the chassis space. The car is shaft-driven with three nearly identical differentials to guide the power; each is a bevel-gear diff with bearings on each outer end (at the diff joints) to make the shaft spin more smoothly. A single-speed tranny comes with

## SPECIFICATIONS

Scale.....1/8  
List price .....\$499.99

### DIMENSIONS

Length (overall).....22.20 in.  
Wheelbase .....12.80 in.  
Width (F/R) .....9.80 in.

WEIGHT (gross, RTR) .....6.8 lb.

### CHASSIS

Type.....Pan  
Material.....Duralumin

### DRIVE TRAIN

Type .....Gear/shaft  
Primary .....Clutch/pinion/spur  
Transmission .....Gear  
Differentials (F/C/R) .....Bevel gear  
Slipper clutch.....No  
Bearings/bushings .....Bushings  
and bearings

SUSPENSION (F/R) ....4W, independent, double-wishbone

Damping ....Plastic oil-filled, coil-over

### WHEELS

Front type .....2-piece plastic  
Rear type.....1-piece plastic  
Dimensions (DxW, F/R) 3.25x1.5 in.

TIRES (F/R) .....Pneumatic rubber, radial-pattern tread

### ENGINE

(not included).....O.S. Max RX .21  
Pipe .....Kyosho stock dual exhaust  
Carburetor .....O.S. Max RX stock

### ELECTRONICS

Futaba PCM 1024 (FP-T3PB) radio;  
Futaba FP-R113IP receiver; JR NES-4735 steering servo; Futaba FP S-130 and Airtronics 94102 throttle servo.

### OPTIONS

Dynamite power pack receiver battery pack; Dynamite lightning line fuel tubing; SCI BEC Guardian indicator light; Kyosho fuel warning light.



PHOTOS BY JOHN HOWELL



## KYOSHO GP-20 ESPRIT 4WD

the kit, but a 2-speed tranny is also available as a hop-up (I'll cover that later!).

A 4W, independent, double-wishbone suspension with plastic, coil-over, oil-filled shocks provides support for the GP-20. In the front and rear, huge resin bumpers protect the car from major damage. The rear bumper is conveniently cut to form a handle

***The tires included in the kit performed very well, but the inserts bunched up inside. Notice the faux brake disks inside the rims (just like the real car).***



that's great for carrying the car to and from the track.

Other features include a dual-center brake system that allows independent front and rear brake adjustments; a massive, dual-exhaust muffler (with two tail pipes) made out of light, resin plastic. A long, aluminum radio plate runs almost the full length of the chassis' right side. This plate is screwed on to posts on the main chassis and can easily be removed for installation and/or maintenance of the electronics or other components.

If you plan to run the car using Kyosho's Lapboy lap-counting system, all the needed hardware for mounting the components is included. (No, the Lapboy itself isn't included.) And to make sure that the GP-20

## Things You'll Need

To get the GP-20 up to speed, you'll have to get your hands on the following:

- .21 rear-exhaust engine
- High-quality, reliable 2-channel radio system (including receiver and two servos—one fast and strong steering servo and one throttle servo)
- Ni-Cd receiver battery pack
- Fuel
- Glow-plug igniter
- Hand-held starter or starter box (if engine isn't pull-start)
- Body (not included in GP-20 chassis kit)

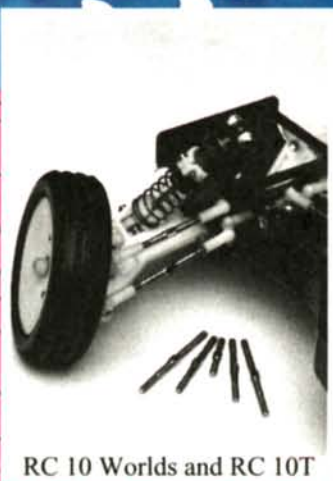
runs nice and cool, Kyosho also included a cooling-fan assembly that's mounted just in front of the engine and is belt-driven from the crankshaft. The body has to be purchased separately. Kyosho offers a Mercedes-Benz C-Class and an Alfa Romeo 155 V6 TI, both of which are modeled after the European touring cars.

### TEST GEAR

The GP-20 requires a .21 engine; as long as it's rear-exhaust, brand name doesn't matter (I used an O.S.\* Max RX .21). The GP-20

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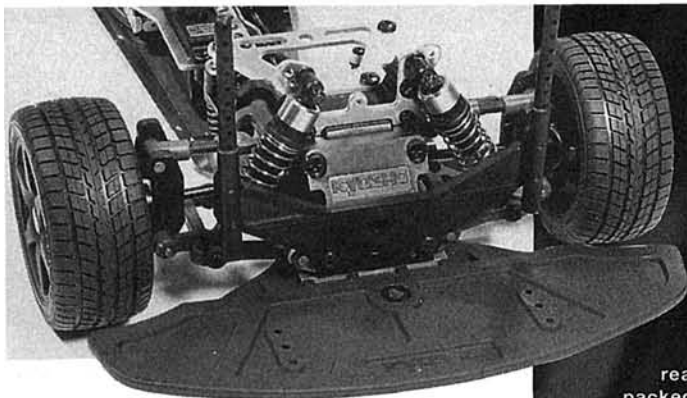
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**Up front, the GP-20 has a massive bumper to protect the car from damage. Plastic oil-filled shocks are included with the kit.**

is a power-packed car, so choose its radio gear carefully. For battery power, I used a Dynamite\* power pack 5-cell receiver pack, which is small and fits perfectly beneath the radio plate, opposite the engine. For my steering servo, I chose a JR\* NES-4735, and for a throttle servo, I tried a Futaba\* FP S-130 and an Airtronics\* 94102, both of which worked equally well.

After installing my "standard" Futaba FP-R113IP receiver for use with my Futaba PCM 1024 (FP-T3PB) radio, I decided to add a few other little details. In the radio plate, I cut a hole for a battery switch, and I added a BEC Guardian indicator from SCI\* that shows the strength of the radio battery pack. I chose to replace the kit's small fuel tubing with Dynamite's lightning line, and last, but not least, I installed a Kyosho warning light that indicates low fuel.

## likes

- Incredible speed (in kit form).
- Blinding speed (with optional 2-speed tranny)!
- Excellent suspension and handling allows very precise driving.
- Overall design makes for easy assembly and maintenance.
- Great options available.

## dislikes

- The chassis is packed a little on the tight side.
- The soft plastic used on the car (especially on the suspension arms).
- The tire inserts bunched up and made the tires wobble.

# BUILDING & SETUP TIPS

I find that building Kyosho cars is relatively straightforward.

The instructions are a little harder to decipher than some, but considerably better than others (whose names won't be mentioned!). I don't really like the way the parts are packed, but my conscientious parts-sorting routine before I start construction avoids any confusion. The GP-20 also comes partly assembled so a lot of the work has already been done. Though you miss out on the assembly of the drive train, the instructions have diagrams of all the components (as well as a very well-drawn exploded view) in case you do some maintenance or want to tear the car apart and start from ground zero.

Most of the work went into building the car's suspension and installing the engine and radio gear. Before you build the car, you might want to consider some of the available options. I decided to build the car in its kit form and play with some of the hop-up items later. Though this is a perfectly acceptable way to work with the car, it does mean you'll have to do some undoing and re-doing. Parts on the car that have optional hop-ups are clearly marked "OPT" (e.g., any of the metal bushings can be replaced with bearings).

It's a good idea to check out the "Adjustments" section of the instructions. It gives information that helps you tune your car to suit your racing needs. Again, though the adjustments can be made at any time and the instructions set the car up in a good "standard" way, you may want to your GP-20 to be set up a certain way to begin with.

Finally, do yourself a big favor and tear out the symbols list on page four and tape it to your workshop table. This way, when you get to page 11, you'll know what all the little symbols are trying to tell you!

As I mentioned earlier, the assembly of Kyosho cars is fairly simple. The GP-20 was no exception. There were, however, a few areas that could use some extra attention:

- When building the upper front- and rear-suspension arms, be sure that the setscrews go in straight. The gray plastic that's used for the arms is a lot softer than a lot of plastic I've worked with on other cars. I got halfway through one only to find that the screw had dug itself in at a funny angle. Unless you want a screwy car, this isn't the way to go! A few other spots on the car have very soft plastic as well: the ball ends of the rear chassis support, the ball end on the throttle rod and the lower front- and rear-suspension arms. Be sure not to over-tighten screws in these areas.

- Before working on the rear suspension, be sure that the rear shock tower plate is installed the correct way. It's a part of the car that comes preassembled, and on my car it was assembled backwards! It wasn't the end of the world, but it meant re-doing most of the rear-end work later. The instructions are drawn correctly, so just check it against the picture.

- Loctite\*. Yes, here's my standard speech

about using Loctite (or any brand of thread-lock) on areas that require that metal screws be screwed into metal parts. Even on-road cars take a good rattling. Without thread-lock of some sort, it's very easy for metal screws to wiggle loose and even fall off (yes, it's as embarrassing as it sounds!). The instructions list specific places where thread-lock is needed. I used Loctite Blue on all metal-to-metal attachments and Loctite Red (the really tough stuff) on the engine drive shaft (on the clutch nut and the outermost screw on the shaft).

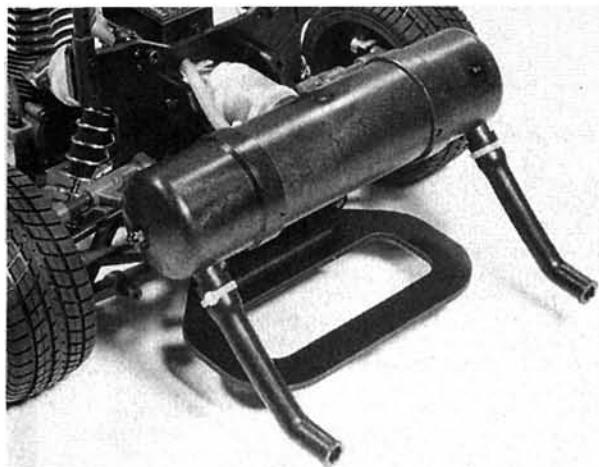
- To ensure that the cooling fan is installed facing the correct way (so the air flows toward the rear), put the fan-blade piece on a screwdriver and spin it counterclockwise. Once you feel the way the air is flowing, you can attach the other fan pieces to the blades the correct way. I also found that the two metal bushings on the blade assembly can be replaced with bearings to make the fan run more smoothly.

- One major hop-up for the GP-20 is the 2-speed tranny. The only drawback (although very minor) is that you can't use the cooling fan with the 2-speed option. To install the 2-speed, you'll have to remove: the cooling-fan assembly mount; the fuel tubing that goes to the carb and the muffler; the engine and the center diff assembly. Though you have a little more room to maneuver, it isn't necessary to take out the fuel tank and the radio plate. I had to make some slight modifications to fit the 2-speed in my GP-20. I trimmed a little off the radio plate where the spur gears are, and I cut a larger hole in the chassis next to the spur gears. I replaced the front dogbone with the one that comes with the 2-speed kit, and I also replaced the rear dogbone with a slightly shorter one to allow the drive train to run smoothly. After rebuilding the engine drive shaft (some parts from the stock kit are re-used), I had to carefully heat the fuel tank with a heat gun and make a small indentation in the tank to ensure that the end of the drive shaft wouldn't rub against it. There are two setscrews in the 2-speed assembly; one is the shifting-adjustment screw and the other holds the gears onto the shaft. I used Loctite on the screw that holds the gears onto the shaft because I found that it rattled loose very easily. As for setting the shifting adjustment screw, I started by tightening the screw all the way down, and then I slowly turned it out (counterclockwise) until the gear shifted at the rpm that I wanted. It's a bit of work getting your tranny to shift correctly, but when it has been set, you shouldn't have to play with it much. And to anyone who hasn't used a 2-speed tranny before, let me say this: when it shifts, you'll know! Until then, it ain't shiftin'!

- While installing the 2-speed tranny, you might consider stepping the brakes up, too. I got my hands on a DuraTrax Multi-Disk Brake kit, which replaces the two plastic brake disks that come with the kit with six disks of a better quality. Installation is easy; the only thing you may need to do is shave a little more off the radio plate to allow the brakes to operate freely.

### FACTORY OPTIONS

- Optional bodies: Mercedes-Benz C-Class (KYOC 2430) and Alfa Romeo 155 V6 TI (KYOC 2431)
- Big Pressure aluminum shocks set (F/KYOC 5733; R/KYOC 5734)
- Car stabilizer set (F/KYOC 3822; R/KYOC 5953)
- 2-speed tranny kit (KYOC 6172)
- Brake upgrade kit (DTX 2560)
- Full bearings set (KYOC 2211)



**The resin muffler does a good job of routing the exhaust to the rear of the chassis, and it's pretty quiet. Notice the rear bumper that also acts as a carrying handle.**

## PERFORMANCE

With my radio gear charged and my tool kit packed, I set out to see what the GP-20 could do in "kit form." I went to a local school that has a great little go-cart track. It's a perfect 1/10-mile course with two straightaways, a wide corner at the far side and a set of tighter turns at the near side. I had raced several other cars at the track and was eager to see how the GP-20 would compare.

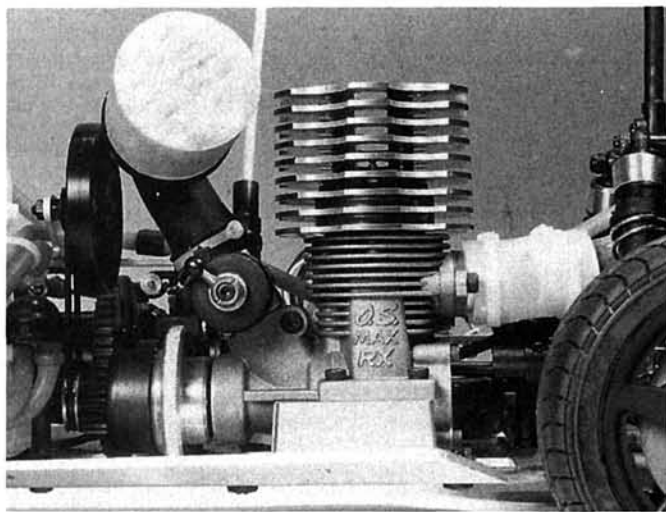
The engine that I used had just been re-fitted with a new piston and sleeve, so for a little while, I took it easy to break it in. After four tanks, I started to lean on the throttle more and more until finally, I got the car up to comfortable screaming speed! This is the fastest car I've ever driven. It beat out my lightning-fast direct-axle-drive Apex 10—something I wouldn't have believed possible! Even at top speeds, I began to appreciate the car's size, weight, suspension and superb handling. Its size and weight gave me the liberty to maintain higher speeds all the way around the course, even through the corners, without its going wildly out of control. The suspension ate up all of the ruts and dips in the course that again made for a crazy ride with other on-road racers. And the GP-20's handling really let me attack the course with a control I had never had before! Needless to say, it was a very

long afternoon of racing! And when the day was over, I actually asked myself, "Does it get better than this?"

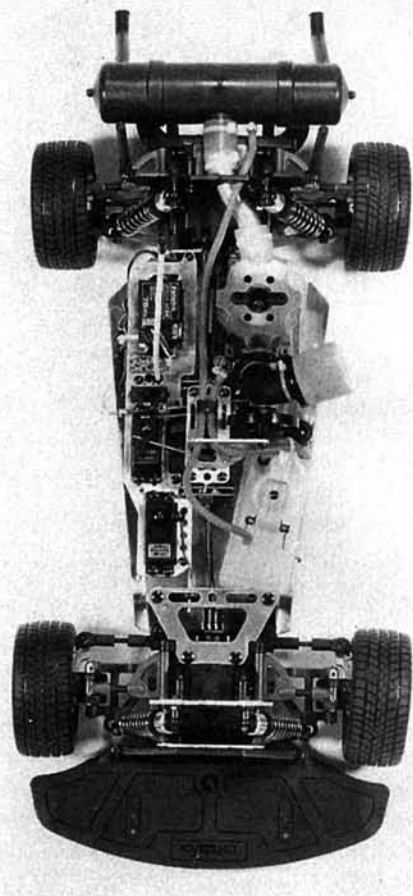
I did mention I got the 2-speed tranny kit for this car, didn't I? That night, it was time to re-fit my GP-20, and the 2-speed tranny was the first thing to install. While I had the car in pieces, I threw in DuraTrax's\* 6-disk brake set, along with a new set of Big Pressure aluminum shocks (one of Kyosho's hop-ups for the GP-20). I also took the tires off and pulled out the foam inserts

because they were bunching up and making the car drive somewhat awkwardly. In no time, I was ready to hit the track again.

In my opinion, there are certain thrills to racing R/C cars that exceed average levels of fun: for instance, taking a wicked huge jump, or (though it's often painful) having a car flip about 50 times in a row and landing on its feet. Well, I reached another R/C high when I finally got the 2-speed to kick in on my GP-20! The speed was absolutely unbelievable! It did take a while for me to get the 2-speed adjusted correctly. It either shifted too quickly and slowed acceleration, or it kicked in too late (just as I was about to hit the turns!). With some patience though, it's possible to set it almost precisely where you want it. The instructions tell you to have it shift when it reaches 80 percent of the car's maximum rpm; I set it to shift where I wanted it (probably about the same place).



**For the power, I chose the O.S. Max RX-B engine. It really propelled the GP-20 to outstanding speeds. Notice the cooling-fan unit that was included in the kit.**



**The chassis layout for the GP-20 is similar to that of the Inferno, but it's a little on the cramped side.**

After several laps, I was glad that I had put in the new brakes. In earlier runs, I had been a little nervous that I wouldn't be able to pull out of certain situations at top speeds; the 6-disk system gave me a better grip on things—literally! The shocks were also a good addition. Though the stock set was good, the Big Pressures fine-tuned the car for even smoother performance.

## FINAL THOUGHTS

Is bigger better? That's a difficult question. In my opinion, racing an 1/8-scale car is something that everyone should try. And if you're going to try it, I highly recommend the GP-20! The car's design not only makes for one heck of a ride, but it also gives you the flexibility of options and features, and that possibly makes it the best vehicle you've ever owned! Derived from the Inferno, a car that has proven its enduring greatness, the GP-20 is a surefire hit. And is bigger better? Hmmm. OK. Here's my answer: if the GP-20 is "bigger," then the answer is yes!

\*Addresses are listed alphabetically in the Index of Manufacturers on page 200.





**KNEEL BEFORE**

**ZOD!**





by FRANK MASI

# Tamiya Dyna Blaster

**T**HE DYNA BLASTER is Tamiya's\* first *real* effort to enter the crowded 1/10-scale, electric racing truck division. I remember the Blackfoot and the King Cab, and I vividly recall thrashing on a Stadium Blitzer. Trust me, though; those Tamiya trucks weren't stadium racers; the Dyna Blaster is!

At first glance (albeit, a quick one), the Blaster closely resembles a Losi LX-T. It has a molded "tub" chassis and long A-arms. It also has a compact transmission with a ball diff and a slipper clutch. As I began to build the Dyna Blaster, it became apparent that Tamiya designed it to parallel the best in the business. But would it really be able to compete with the top guns? You'll have to read the rest to find out.

## KIT FEATURES

The Dyna Blaster chassis is made of three components. The middle section—to which the front and rear suspensions are attached—is molded and formed to provide rigidity. Strengthening ribs in the middle section divide the chassis into compartments, leaving space for the battery pack along the chassis' middle and a place to mount the receiver on either side of the battery. The battery channel looks as if it can accommodate up to seven cells in side-by-side fashion, but because I used a 6-cell pack, I installed the provided spacer to take up the extra room.

The front suspension consists of long lower A-arms and adjustable upper camber links. These front arms are molded of a material that looks like glass-filled nylon. (The main chassis, rear arms and shock towers are also made of this material.) The arms pivot on their hinge pins with the aid of small bronze bushings. The bronze-to-steel contact produces less friction than that of plastic-to-steel, and you can just replace the bushings as they become worn instead of spending more on a new set of arms.

My hopes that the Dyna Blaster would be a bona fide competitor were dashed

## SPECIFICATIONS

Scale ..... 1/10  
Price ..... \$330

### DIMENSIONS

Overall length ..... 15.5 in.  
Wheelbase ..... 11.5 in.  
Front width ..... 11.5 in.  
Rear width ..... 12 in.

### WEIGHT

Gross (w/ batteries) ..... 3 lb., 15 oz.

### CHASSIS

Type ..... Two-piece modular  
Material ..... Plastic/fiberglass

### DRIVE TRAIN

Type ..... Sealed-gear drive  
Primary ..... Pinion spur  
Transmission ..... Universal joint dogbones  
Differential(s) ..... Ball diff slipper clutch  
MDC (Multi-Disk Clutch)  
Bearings/bushings ..... Bushings

### SUSPENSION

Type (F/R) ..... Independent A-arm  
w/adjustable camber link w/sway bar  
Damping ..... Plastic, oil-filled,  
coil-over shocks

### WHEELS

Type (F/R) ..... One-piece plastic  
Dimensions (DxW)  
—Front ..... 2 3/8 x 1 3/4 in.  
—Rear ..... 2 3/8 x 2 in.

### TIRES

Front ..... Rib spike  
Rear ..... Spike X-pattern

### ELECTRICS

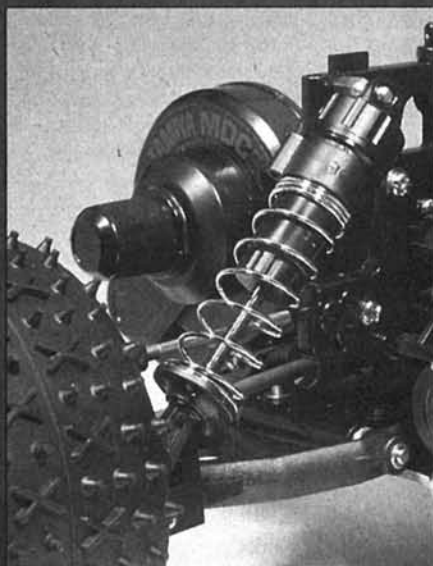
Motor, battery, ESC ..... Not included

**OPTIONS TESTED:** Point Blank 1400  
SCR Master Matched battery pack, Tekin  
411 G2, Futaba 2PD Magnum radio gear,  
Peak Performance Macho Stock motor,  
Futaba S9301 servo



## Building & Set-Up tips

- Unless you have your own set of 64-pitch pinion gears, use the 0.4 spur gear because it will match the supplied pinion gear.
- For better front damping, use one-hole pistons instead of the two-hole pistons recommended in the instructions.
- If you're a serious racer, upgrade to aluminum shocks. The plastic shocks will not hold up to serious abuse.
- Initially use the included front sway bar. It will make the truck easier to drive for novices, then take it off if you want more low-speed steering.



*Though I think a truck of the Blaster's caliber should have a set of metal shocks, during tests, the kit's plastic ones performed adequately.*

## Factory Options

- Aluminum shocks with special poly sleeve insert  
Part no. 53125
- Acto Power off-road motor  
no. 53122
- Adspec 2-channel R/C system  
no. 45009

## Things You'll Need

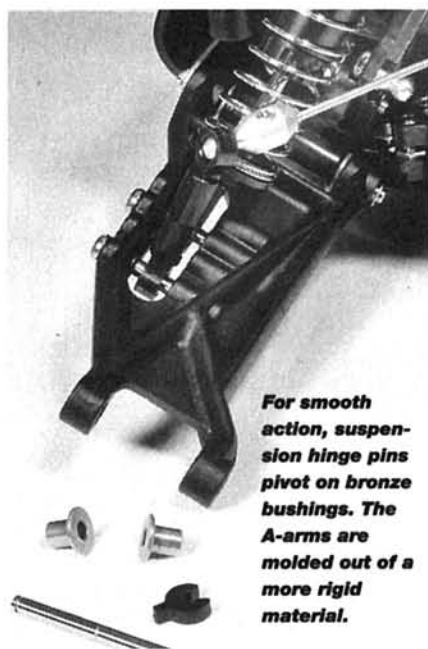
- ESC
- Motor
- Batteries
- Radio gear
- Servos

My hopes that the Dyna Blaster would be a bona fide competitor were dashed when I discovered that it had *plastic* shocks. Plastic shocks won't last as long as aluminum shocks, and there's too much room between

the shock pistons and the inside of the shock bodies for really good damping. Any time too much oil is allowed to seep around the piston, the shock will let the suspension bottom out too quickly over large bumps and jumps. This is the biggest complaint I have about molded shocks; they feel good and perform well over smaller bumps, but they let you down when the going gets hairy. The bottom line is: upgrade if you're a serious racer; if you're not, the plastic shocks will hold up under normal abuse.

The entire front suspension is bolted to a kicked-up nose piece, which, in turn, is attached to the main chassis. There's not much rigidity to this assembly until you attach the upper plate (which extends from the front suspension bulkhead to the front of the battery compartment); then the front end feels rock-solid. The Dyna Blaster also comes with a front sway bar.

Steering is handled by a dual bellcrank system that uses a molded drag-link. My steering servo fit nicely, and the supplied mounting posts and servo-saver made

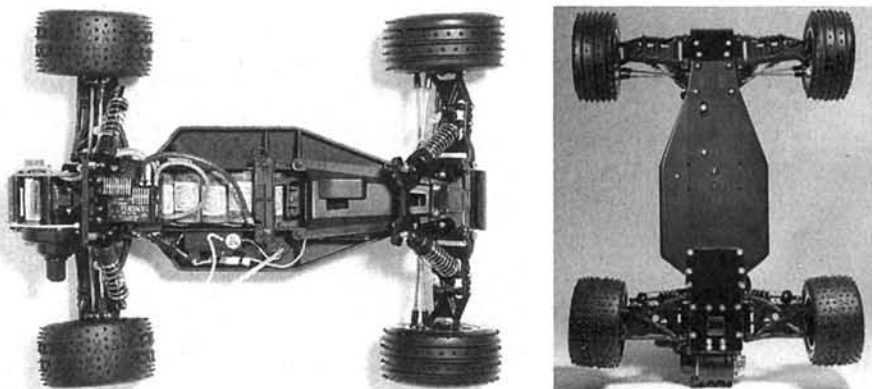


*For smooth action, suspension hinge pins pivot on bronze bushings. The A-arms are molded out of a more rigid material.*

installation easy. The steering linkage (and the front and rear camber links) is made up of threaded steel rods with molded ball ends. Sorry, kids, no turnbuckles!

The Dyna Blaster's three-gear, fully ball-bearing-equipped transmission was a very nice surprise. It uses a racing-type, adjustable ball diff that's different from the one in older Tamiya kits. The new ball diff is adjusted by means of a screw, and Belleville washers provide the necessary tension. A U-shaped piece of rod allows you to check the diff's setting before installation; just place the U-rod through the slots of each outdrive and try to turn the diff gear (it should be very difficult when the diff is properly set). Diff action is super smooth, rivaling that of any truck.

To limit wheelspin on slippery surfaces, the Blaster comes with Tamiya's MDC (Multi-Disk Clutch) friction slipper clutch,



*The Dyna Blaster has all it needs to be a winner. As you can see, its layout resembles those of most popular racing trucks. Right: the Dyna Blaster's three-piece chassis is very rigid. To increase strength, the middle section is molded out of the same material as the suspension arms.*



## likes

- High-quality parts.
- Very rigid chassis.
- Good transmission, i.e., ball diff and slipper clutch.

## dislikes

- Doesn't have full ball bearings.
- Plastic shocks.

which uses not one, but three, slipper disks for more surface area. This allows the load from the clutch's spring to distribute its pressure more evenly for more consistent operation. The disks, as well as the "inner disk" spacers, reside in a lightweight cast-aluminum housing to which the spur gear is attached. Speaking of which, two spur gears are included with the kit—a standard, 64-pitch gear and one that's 0.4 module (what's commonly referred to as "metric pitch"). After bolting the motor to the Dyna Blaster's aluminum motor-mount plate, I covered the pinion/spur/slipper with the included, molded gear cover. This cover is great because it has a "screw-in" slipper adjustment cover that's O-ring sealed.

The rear suspension arms, bulkhead and transmission are bolted to a fiberglass plate that's attached to the main chassis plate. For added strength, an upper plate bridges the distance between the rear bulkhead and the rear of the main chassis. This plate makes a perfect ESC shelf. The rear lower arms are long, they're molded of the same rigid material as the front arms, and they have the same little bushings for their hinge pins. The molded rear uprights (hub carriers) provide a mounting point for the upper camber rod, and they hold the kit's universal-joint drive shafts, though you only get bronze bushings for the shafts. At least, it's really easy to upgrade to bearings—the tranny already has them—so you only need to buy bearings for the rear drive shafts and the front wheels.

Here's the part where I usually say that I sent the body off to Motion Graphics or Bich'n Bodies. Nope, this time, I did it myself. Tamiya includes so many decals with which to detail the body that you'd have to be a real spode to mess it up. After a simple two-color (fluorescent red and yellow) paint job, I painted the tonneau cover flat black (on the outside of the polycarbonate body), then I detailed the roll bar with silver paint. It took me a long time to apply the decals, but the result is well worth the effort; they make the truck look cool *and* they cover up my so-so paint job! Now, I was ready to blast!



### TEST GEAR

I tested the Dyna Blaster with Futaba\* 2PD Magnum radio gear and a Futaba S9301 servo. I chose the Tekin\* 411 G2 for my speed control. A Point Blank\* 1400 SCR Master Matched 6-cell battery pack sup-

plies the power for the Peak Performance\* Macho Stock motor.

### PERFORMANCE

I set the Dyna Blaster's camber and front toe angles approximately and charged my pack for a little blast session. "Waaaaaah!" I had forgotten to tighten the slipper clutch, so I removed the little cover and inserted the Tamiya box wrench. It still whined. Hmmm. It seemed that I had violated my own prime directive: always make sure that your diff is set tighter than your slipper clutch.

After that debacle, things started to come together. The Blaster performed admirably; it was smooth over the bumps—as any race truck worth its tires should be—and it was stable. I'm kicking myself ("whud, whud, whud") for not heeding my own intuition when I built the shocks. The instructions tell you to use the two-hole pistons up front. I used one-holes for the rear shocks and this felt perfect. But, being a conformist, I followed the instructions for the front assembly to the

letter and ended up with front damping that's too soft! The result was that the truck lacked high-speed steering and tended to bounce a bit over sharp bumps. Oh, well, maybe when I get the time, I'll install the one-hole pistons.

### FINAL THOUGHTS

The Dyna Blaster was a lot of fun to drive. I can't say that it could hold its own in a big, national-level race, but in the hands of the neighborhood club racer, it's capable of taking home some trophies. Tamiya has come very close to their target of challenging the established champions of racing trucks, but they need to fine-tune their product formula; if the Dyna Blaster is supposed to be a racing truck, they should include *full* bearings and metal shocks. Tamiya, you're so close. Just one more step...

\*Addresses are listed alphabetically in the Index of Manufacturers on page 200.

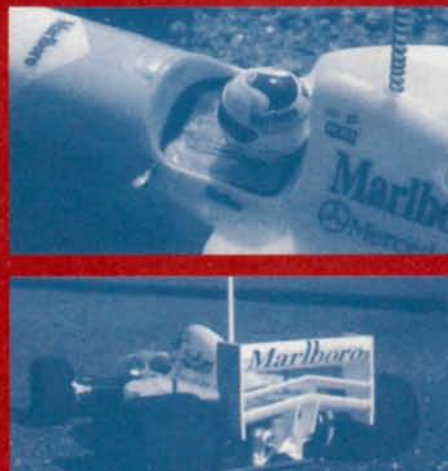
## THE COMPETITION

	Pro XRT Sport	Dyna Blaster	RC10ST	Club 10 Storm	MT 10S
Wheelbase	11.50 in.	11.50 in.	11.375 in.	12.90 in.	13 in.
Width	12.00 in.	12.50 in.	12.50 in.	12.04 in.	13 in.
Weight	4 lb., 1 oz.	3 lb., 15 oz.	3 lb., 15.40 oz.	3 lb., 7.58 oz.	4 lb., 2 oz.
Diff type	Ball	Ball	ball	ball	Ball
Chassis	Kelron II	Plastic/fiberglass	Aluminum	Aluminum	Composite plastic
List price	\$180	\$330.00	\$240	\$189.50	N/A
Available at*	\$119.99	\$189.95	\$119.99	\$110	\$110
Reviewed in	To come	8/95	3/95	To come	1/95

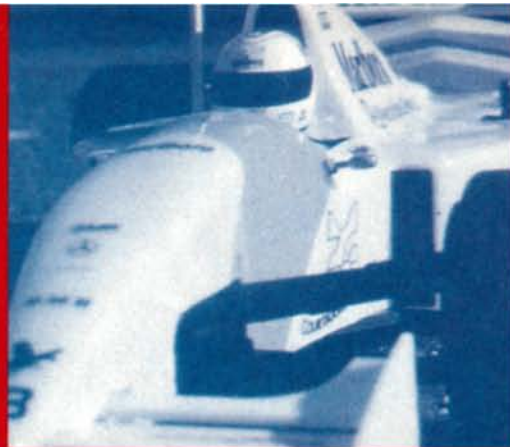
\*Prices vary by location.



# Pro-Level F1 Racing Chassis!







## SPECIFICATIONS

**SCALE** ..... 1/10  
**LIST PRICE** ..... \$285

### DIMENSIONS

**Overall length** ..... 15.5 in.  
**Wheelbase** ..... 10 in.  
**Width—front** ..... 7.75 in.  
           —rear ..... 8.25 in.

**WEIGHT** (gross, RTR w/6-cell pack) ..... 2 lb., 4 oz.

### CHASSIS

**Type** ..... Double-deck  
**Material** ..... Fiber-reinforced graphite

### DRIVE TRAIN

**Type** ..... Direct drive  
**Primary** ..... Pinion/spur  
**Transmission** ..... None  
**Differential** ..... Ball diff  
**Slipper clutch** ..... None  
**Bearings/bushings** ..... Bearings

### SUSPENSION

**Type—front** ..... Articulated upper and lower A-arm  
           —rear ..... Captured rocker ball and rocker arm  
**Damping—front** ..... None  
           —rear ..... Oil-filled shock; spring-loaded washers

### WHEELS (F/R)

**Type** ..... Nylon, 1 3/4-inch diameter

### TIRES (F/R)

..... Green-compound foam



# HPI Super F1

by DOUG MERTES

**O**VER THE PAST two years, there have been major design advances in the F1 class. In 1993, Tamiya\* introduced the 103/103L chassis series, which incorporated updated front and rear suspension. Kyosho\* countered in 1994 with the Impress, the first F1 car to be released with adjustable-camber and reactive-caster front suspension. Now Hobby Products Intl.\* (HPI), long known for high-quality aftermarket performance parts that fit a variety of on- and off-road R/C vehicles, has released their first complete kit. This eagerly awaited F1 entry is one of the most advanced designs available to racers in 1995.

### KIT FEATURES

The HPI Super F1 kit has it all! The main chassis plate and upper brace are cut out of open-weave graphite (the kit is also available in fiberglass). The fully adjustable front end is molded from high-strength nylon-composite materials. A complete ball-bearing set is included (so are alternative nylon bushings), as are aluminum hubs, a topnotch ball differential and a graphite rear axle with a 64-pitch spur gear. The rear pod doesn't use the typical flex-plate that's seen on every other F1 car. Instead, two rocker balls in nylon cages provide fore-and-aft movement, while an innovative captured roll brace, socket and spring set allow side-to-side action and tweak adjustment. Damping rate is controlled by a washer-and-spring combination that's similar to top-level pan cars and F1 cars. This is a truly innovative design based on existing technology, and it yields a rear pod with lots of traction potential. The kit-supplied oil-filled shock is smooth, leak free and simple to assemble, and the front and rear wings supply just the right amount of downforce at each end.

One of the most controversial design aspects is the use of 1/10-scale wheels and tires. Many F1 aficionados were afraid that the wheels would appear out of scale, but I think they look just right. Plus, if you own a pan car, you've





The first-rate instruction manual contains all the directions you need to put the HPI Super F1 car together. It includes full-scale pictures of every part that's used in every step, as well as exploded line drawings, so it's hard to go wrong. Every numbered bag includes only the parts you'll need for each corresponding step. Be sure to remove any extra flashing from the molded parts that are cut off the parts trees. The quality is so good that I doubt you'll have to do much hand finishing to make everything fit properly.

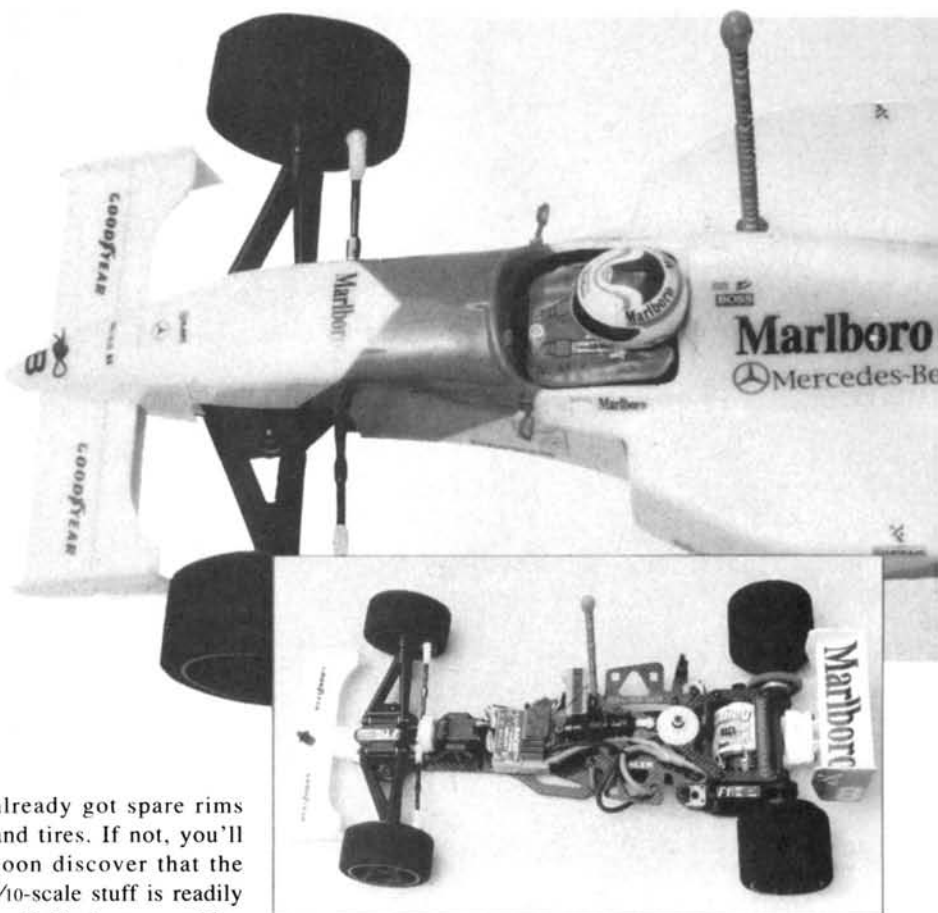
I used BRP's new, no-brainer tool to install the ball ends in the front suspension. The tool uses a 2-56 screw, a drilled-out nylon nut and a wing nut to press the balls into place without leaving any damaging pliers marks. It's the kind of thinking that Bud Bartos is known for, and it works like a

charm. You'd have a hard time getting mine away from me!

I suggest that you use a permanent marker to put dots or stripes on the white front-end spacers because they're very small and blend in with almost any color carpet when they bounce off the workbench. (I spent 1/2 hour on my knees trying to find them!) Build the front end on a dark-colored towel, and you'll have fewer problems.

The front end doesn't incorporate a rising-rate caster design. Kent Clausen from HPI told me that most drivers don't want it, or wouldn't know how to use it to their advantage. As it is, the front end has an awesome amount of steering built into it. They should include in the kit another top suspension arm mount that raises the rear arm pivot points 1 millimeter. That would give racers the option of adding Reactive Caster to their cars if they want to. Alternatively, you could place a 1mm washer under the upper arm mount where the rear bolt passes through, but I'm not sure that you'll get the same solid front-end feel with a gap between the upper and lower mounts.

Mounting tape is included to attach the front and rear donuts to the rims. It's very thin, and it works pretty well. I still prefer to glue mine on with Weldwood contact cement or AJ's tire glue, but either method is acceptable. The body you see in the pictures is the same beautiful McLaren piece that HPI has sold for the past year, and it's included in the kit. I used an assortment of custom decals to set this one up as a 1995 Mercedes/Ilmor-powered car driven by Nigel Mansell. My finished body matches the white front and rear wings nicely, and the bright colors should also show up well on the track.



already got spare rims and tires. If not, you'll soon discover that the 1/10-scale stuff is readily available in every rubber compound and is easier to locate than tires and rims specifically sized to fit other brands of F1 cars.

## TEST GEAR

Because it's difficult to put a lot of power to the ground with an F1 rear pod, I decided to go easy in the motor department. I installed an HPI, 15-turn, machine-wound, bushing, modified motor with the kit's 64-pitch pinion gear; the combination of the motor and gearing gives me both punch and top speed on the carpet and the parking lot. A trio of 0.01mf capacitors and a Schottky diode prevent glitches when Novak's\* nifty new Polaris AM receiver catches the signal from my Futaba\* Magnum Junior radio.

The throttle information is sent to a new One-Touch™ Novak Racer speed control, while steering chores are handled by a high-speed Futaba 9601 servo. You really need to use a 6-cell stick-type battery pack with this chassis design (there's too much exposed conductive graphite to use an in-line pack), and one of Tamiya's 1400 SCRC race packs fits the bill nicely. I replaced the original battery plug with a set of Race Prep's\* green low-loss connectors because they're shorter and fit more easily under an F1 body shell.

**This is one of the best, most solid chassis in the business. If you're in the market for a competitive F1 car, this one might be for you!**

## PERFORMANCE

The kit's tuning instructions give you a base-line suspension setup that should work well as a starting point for most tracks and surfaces. If you need less steering and front-end bite, HPI suggests that you install the supplied O-rings in place of the kit's front springs. (For those who want a greater range of spring choices, Associated\* front springs will also fit if

**likes** 

- Parts are beautifully made out of the very best materials.
- Terrific performance out of the box.
- Great instruction manual.

**dislikes** 

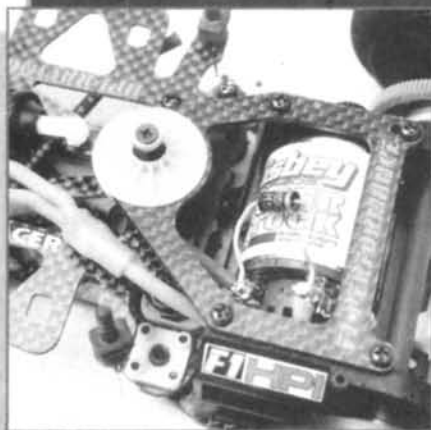
- Servo mount needs to be more adjustable for smaller servos.
- Reactive caster should be an option for the front suspension.





## FACTORY OPTIONS

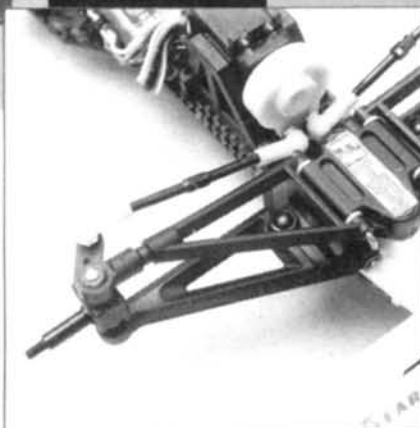
There are no options available from HPI that aren't already included with the kit. Tamiya's battery-retention setup (D Part no. 58130/126) from the 103 series cars fits the HPI chassis and facilitates battery installation. Any 1/10-scale axle or lightweight differential hub will fit if it was originally designed for a narrow chassis, and you might be able to reduce the weight that way. If you prefer them, Titanium turnbuckles from Lunsford\* and Tecnacraft\* could also be used. If you want your car to look different, any Tamiya 103 series body, front wing, or rear wing will fit.



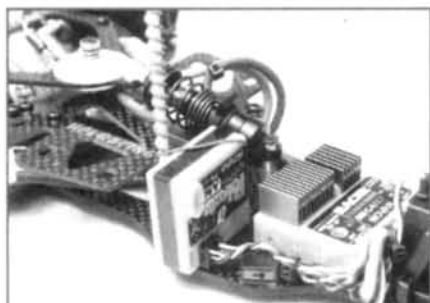
The rear pod uses captured rocker balls and a rocker bar to provide slop-free, smooth suspension travel. The shock and washers control damping.

## Things You'll Need:

- Electronic speed control
- Transmitter and receiver
- Steering servo
- 6-cell stick-type battery pack
- Motor
- Battery charger
- Lexan paint for the body



You've never seen a front end like this on an F1 car. A similar design with shorter arms is available for 1/10-scale Associated-type pan cars.



There's plenty of space for the ESC on the chassis, but the small Novak receiver makes it easier to mount everything.

you shorten them a little.) You can also slow down the steering by increasing caster, which leans the tops of the kingpins toward the rear of the car. Camber (the angle at which the tops of the tires lean in toward the center of the car) is increased or decreased by turning the upper-suspension-arm turnbuckles. Steering-link turnbuckles make it easy to adjust front toe-in as well.

An interesting additional design feature is the in-line/trailing front axle option. By flipping the axle blocks over, you can alter

the ease with which the car initiates a turn. This is the kind of steering geometry alteration that you'd normally have to buy as an aftermarket piece. Shock-spring tension, shock-fluid viscosity and damping fluid used on the washers alter the rear pod's roll rate and are additional tuning aids.

I tried the HPI F1 car on both asphalt and carpet, and I was able to dial the car in right away on both surfaces. There are so many adjustments available to counter various handling challenges that even an aver-

age driver can look like a pro with a little experimentation! With a trailing-axle/high-caster/negative-right-camber/positive-left-camber front-end setup, the car handled a banked carpet oval with ease—something that's not possible with many short-wheel-base F1 cars. Using an in-line-axle/negative-right- and left-camber/low-caster setup, I slipped the HPI through a narrow 1/12-scale carpet course as though I had been driving it for years. I was able to better my previous best F1 roadcourse track time on the first outing. Imagine what I could do with a little practice and setup time!

## FINAL THOUGHTS

I've built and raced every available F1 car on the market, but in my opinion, none of them can match the performance of the HPI Super F1 car kit, and none is as easy to build. Whether you race in a class that allows articulated front arms and a graphite chassis, or you're just looking for a fully adjustable parking-lot F1 car, you'll be glad you have one!

\*Addresses are listed alphabetically in the Index of Manufacturers on page 200.

## THE COMPETITION

	Kyosho Impress	Tamiya Ferrari F1	HPI Super F1
Wheelbase (in.)	9.8	10.4	10.0
Width (in.)	7.9	8.0	7.75 (F), 8.25 (R)
Weight	2 lb., 2 oz.	2 lb., 6 oz.	2 lb., 4 oz.
Diff type	Ball	Ball	Ball
Chassis	Fiberglass	Fiberglass	Graphite
List price	\$199	\$243	\$285
Available at*	\$149	\$119 to \$165**	\$169 to \$179
Reviewed in	2/95	TC	8/95

\*Prices may vary with location. \*\* Several body styles are available.





# '95 U.S. Oval Masters

by RICK SCHWARTZ

**I**T'S THE FIRST weekend in April, and you're an oval racer. What are you doing? Well, you could be working on your car for the next club race. You could be hanging out at the mall. You might even be working in the yard or doing that term paper (ugh!). If you're lucky, though, you're at Lake Whippoorwill International Speedway in Orlando, FL, for the fifth annual Oval Masters.

This year, more than 300 drivers competed for seven titles to determine the best oval racers in the U.S. Every level of competition—from amateur to pro to invitation only—was represented.



## Joel's Winning Whipp Setup

Joel Johnson's Trinity EV10ss dominated the Invitational class at the Whipp this year. How did he do it? Well, his car was set up perfectly, and I guess good driving skills had more than a little to do with it. Let's take a peek at the machine behind the win.

### Front end

- **Right front**—green non-progressive spring (EV0127); 4 to 5 degrees of caster; 3 to 4 degrees of negative camber.
- **Left front**—purple non-progressive spring (EV0126); 1 to 2 degrees of caster; 2 degrees of positive camber.
- **Damping**—moderate. Joel used a heavy grease with Trinity's O-ring cups (EV0144).
- **Toe-in**—1 degree. The inside front points were raised using Trinity's medium-height ball studs (EV0136).



### Rear end

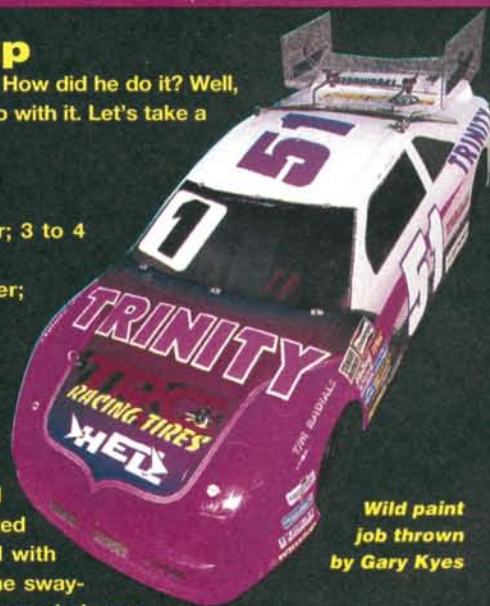
Joel used a 0.093-inch-diameter sway bar, and one rear shock with 40WT oil (RC7640) is mounted on the left side. The middle shock is also filled with 40WT oil and is equipped with a 0.050 spring. The sway-bar links are set vertical. Joel also used Trinity's new axle-lowering rear-pod plates.

### Hot items

As you can see in the photo, Joel used a new ESC—a Helbing programmable speed control. This can program the overall current limiter; it has a starter limiter (known as an off-the-line "punch control"); a turbo feature; and much more. According to Joel, "It's dialed!" Other hot mods include TRC's capped tires and foam bumper, a graphite axle, a Trinity 12-turn quad Kinwald motor, and Trinity World Tech Sanyos.

### Body beautiful

The Bolink '95 Pontiac was painted by Joel's friend Gary Kyes at Team Losi. The wing was mounted using Trinity's Pro-Wing mounting kit (RC6012). The numbers and Trinity logos were cut out of vinyl by Johnson's Graphics. If you're interested in having vinyl logos made for your rad ride, call them at (408) 996-7932.



Wild paint job thrown by Gary Kyes





Reuben Davis presents Bob Hosch with his game jersey from the Super Bowl



Joel Johnson gets his first win in 10 years at the Whipp.

Below: Oval Masters winner Jerry Simmons with Bob Novak and Dana Galletta, the Hooters girl.

"The Whipp" is one of this country's premier oval facilities. The circuit is a duplicate of the Daytona NASCAR tri-oval—banked and fast. Owners Bob and Yvonne Hosch provide a truly professional atmosphere. The track has a large covered pit area (with electricity), plenty of parking, great food, indoor plumbing and a beautiful VIP booth that overlooks the track. If you're interested in

talking to the experts, this is the place to be; all the top

**Modified A-Main winner Jason Alderman.**

racers and manufacturers attend the event.

#### QUALIFYING

The Mains were divided into five classes, and every racer had three tries at making the Sunday A-Main. Saturday was tough because the weather was a little cold and damp, and it took a while for the tires to warm up.

• **Amateur Stock.** In his final qualifier, Danny King TQ'd by driving his Hyperdrive for the event's only 42 laps in 4:05.35. Tommy Rhea (second) and John Grubb (third) ran 41 laps.



# Crack the Whipp!



## OVAL MASTERS

• **Amateur Modified.** Up-and-coming driver Jason Alderman TQ'd by averaging more than 48mph (45 laps in 4:07.64). Larry Flowe and Larry Burkett were close behind with 44 laps in 4:00.46 and 4:00.76, respectively.

• **Invitational.** This was one of the most closely watched and highly contested classes. Joel Johnson—one of the sport's greatest champions—motored his Trinity racer to TQ honors with 46 laps in 4.04.15. Hot on his tail, Chris Schnieder was less than 1 second behind; and, out of retirement, Jimmy Simmons held down third with 46 laps in 4:09.80.



**Dieter tries to make Kinwald the ovalinator.**

• **Enduro**—Amateur Novak 200 and Novak Invitational 500. Both qualifiers lasted 12 minutes with mandatory pit stops. The pit crews had practiced, so the drivers were in and out of the pits in seconds.

—*"The 200."* Jason Alderman drove his Associated 10LSS to the pole position with 125 laps in 12:02.07; and with 121 laps

each, Vicki Carrubba and Paul Schaub placed second and third, respectively.

—*"The 500."* Craig Perry put the pedal to the metal and topped the field with 129 laps in 12:03.50. Last year's winner, Mike Boylan, was 2 seconds behind in second place and Jimmy Simmons was third.

## WINNERS

### Stock A-Main

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Body	Tires
1	5	David Jones	Associated	H/out	Perfect Match	Tekin	Protoform	BSR
2	9	Mark Bergman	HPI	H/out	Sanyo	Tekin	Hot Bodies	BSR
3	7	Glenn Kaeser	Cobra	H/out	Sanyo	Tekin	Bolink	BSR
4	2	Tommy Rhea	Associated	H/out	Crowe	Tekin	Protoform	BSR
5	4	Howard Baird	Associated	H/out	Sanyo	Novak	Protoform	BSR
6	1	Danny King	Hyperdrive	H/out	Sanyo	Tekin	Protoform	BSR
7	6	Bryan Kaeser	Associated	H/out	Perf. Match	Tekin	Bolink	BSR
8	2	Bryan Pundt	Associated	H/out	Crowe	Tekin	Protoform	BSR
9	3	John Grubb	Associated	H/out	Sanyo	Novak	Protoform	BSR
DNS	—	Reuben Davis	Associated	H/out	PTI	Novak	Protoform	TRC

### Modified A-Main

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Body	Tires
1	1	Jason Alderman	Associated	Maxtec	Reuben Davis	Novak	Protoform	TRC
2	8	Chuck Wade	Comp Craft	Twister	Perf. Match	Novak	Protoform	BSR
3	2	Larry Flowe	Hyperdrive	Cam	Sanyo	Novak	Protoform	TRC
4	5	Reuben Davis	Associated	n/a	PTI	Novak	Protoform	TRC
5	7	Byron Shumate	Associated	Eastcoast	Sanyo	Novak	Protoform	TRC
6	4	Keith Shelton	Trinity	Cannon	Sanyo	Tekin	Protoform	TRC
7	6	Paul Schaub	Trinity	Trinity	Trinity	Tekin	Protoform	TRC
8	9	John Bisbee	Associated	Litespeed	Litespeed	Tekin	Protoform	TRC
9	3	Larry Burkett	HPI	Litespeed	Litespeed	Tekin	Protoform	BSR
10	10	Mark Bergman	HPI	Fantom	Crowe	Tekin	Hot Bodies	BSR

### Invitational A-Main

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Body	Tires
1	1	Joel Johnson	Trinity	Trinity	Trinity	Helbing	Bolink	TRC
2	4	Chris Smith	Hyperdrive	Cam	PTI	Novak	Bolink	TRC
3	6	David Puffer	McAllister	Fantom	Voodoo	Tekin	Protoform	BSR
4	2	Chris Schneider	Wood Racing	Fantom	Perf. Match	Tekin	Bolink	BSR
5	7	Jim Fuller	Trinity	Trinity	Trinity	Novak	Bolink	TRC
6	5	Steve Smith	Trinity	Super Critical	Trinity	Novak	Protoform	BSR
7	3	Jimmy Simmons	Wood Racing	Cam	Radical Racing	Tekin	Bolink	BSR
8	8	Ernie Bucci	Trinity	Trinity	Trinity	Novak	Bolink	TRC
9	9	Chuck Baader	Wood Racing	Cam	Radical Racing	Tekin	Bolink	BSR
10	10	Jeff Irish	Composite Craft	Cam	Litespeed	Tekin	Bolink	BSR

### Novak 200 A-Main

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Body	Tires
1	8	Jeremy Kornblatt	Associated	Cam	Reedy	Novak	Protoform	TRC
2	6	Chris Brimmer	Composite Craft	Twister	Perfect Match	Tekin	Protoform	BSR
3	7	Todd Braun	Associated	n/a	n/a	Novak	n/a	n/a
4	9	Spencer Wilson	Hyperdrive	Fantom	n/a	Novak	Protoform	BSR
5	3	Paul Schaub	Trinity	Trinity	Trinity	Tekin	Protoform	TRC
6	2	Vicky Carrubba	Associated	Associated	Power Push	Novak	Bolink	TRC
7	5	Larry Flowe	Hyperdrive	Cam	PTI	Tekin	Protoform	TRC
8	4	Matthew Rogers	Hyperdrive	Cam	PTI	Tekin	Protoform	TRC
9	10	Bubba Coker	Hyperdrive	Fantom	Crowe	Tekin	Protoform	BSR
10	1	Jason Alderman	Associated	Maxtec	Reuben Davis	Novak	Protoform	TRC

### Novak 500 A-Main

Fin.	Qual.	Driver	Chassis	Motor	Battery	ESC	Body	Tires
1	3	Jimmy Simmons	Wood Racing	Cam	Radical Racing	Tekin	Bolink	BSR
2	7	Ricky Jordan	Bolink	Eastcoast	Sanyo	Novak	Bolink	TRC
3	10	Joshua Cyrul	Spectre/ Assoc.	Reedy	Stage III	Novak	Protoform	TRC
4	1	Craig Perry	Associated	Eastcoast	CEB	Novak	Bolink	TRC
5	6	Mike Blackstock	Hyperdrive	Cam	PTI	Novak	Protoform	TRC
6	9	Tony Neisinger	Assoc./Sassy	Fantom	Perf. Match	Tekin	n/a	BSR
7	4	Jim Fuller	Trinity	Trinity	Trinity	Novak	Bolink	TRC
8	5	Chris Smith	Hyperdrive	Cam	PTI	Novak	Bolink	TRC
9	2	Mike Boylan	Trinity	Trinity	Trinity	Novak	Protoform	TRC
10	8	Kevin Trent	Hyperdrive	Cam	PTI	Tekin	Protoform	TRC

# A Level Playing Field

For the first time in the history of the Oval Masters, the Enduro drivers had to comply with limitations on motor specs. Previously, only the stock class faced limits; now, by requiring the modified drivers to compete within certain guidelines, the organizers forced teams to rely on tuning and motor-building skills to outdo others. Racers needed a complete package to be competitive. Following what's usual in full-size stock-car racing (engine limitations), the Masters became even more like "the real thing."

## Modified Motor Specs

• **Winding**—15-turn minimum, single wind, Mabuchi-style cross-wrap.

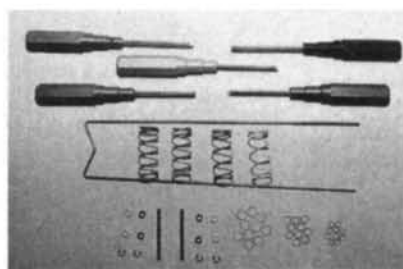
• **Armature**—full continuous stack, minimum height of 0.850 inch, minimum diameter of 0.898 inch.

• **Brushes**—small commutator motor must use a standard standup brushes; large commutator motor may use standup or laydown brushes.

• **Timing**—24-degree maximum.



# New in the Pits



logo says "We Race What We Sell"; and a lot of other R/C enthusiasts race what Wolfe Motorsports sells, too!

## Wolfe Motorsports Hop-Ups

Long known for his "pro-gressive" springs, Budde Wolfe, head man at Wolfe Motorsports\*, had a table laden with pre-bent 0.078- and 0.062-inch wing wire, copper shims for motors, wheels, rear axles in three sizes, a long kingpin set for Associated front ends, four new springs (from softer than black to softer than green) and a beautiful five-piece wrench set that's color-coded and tapered for close work. His company



## BME Patriot II

Here's a brand-new, precision, center-less-ground axle that's unique because it has hex diff rings that won't slip during acceleration and are available in two sizes. The axle is being made in both fiberglass and graphite, and BME's\* owner Bruce Mackiewicz told me to be sure to tell you "Patent pending."

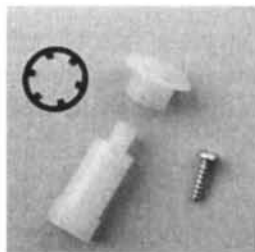
## Reedy Ultra Sonic

Motor man Mike Reedy displayed his Reedy\* Ultra Sonic modified motor. Based on the Sonic Series, it was designed specifically for on-road use. Available with 11 to 17 turns, its smaller commutator produces less torque and higher rpm, so it's perfect for oval racing.



## Kimbrough Body Mounts

With Jay Kimbrough's\* new body mounts, torn bodies are a thing of the past. The setup includes body posts, washers, screws and, most important, a durable nylon button.



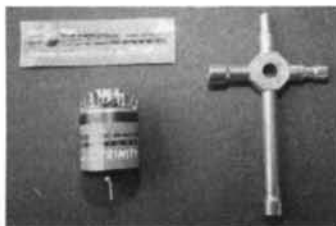
The larger button-head surface will help to prevent the body from cracking and tearing. The easy-to-install body mounts will fit almost all oval racers and improve their aerodynamics.

## TRC Foams and Bumpers

TRC\* offers a few new compounds for their radial tires. TRC President Tim Morton explained that the White dot compound is for slightly slippery concrete

## Trinity Nut Driver and Motor

Trinity's\* Todd Putnam didn't have to be heavy-handed with his prototype four-way nut driver because its long shaft makes it much easier to reach those inaccessible parts. The tool includes 1/4-, 3/16-, 3/8- and 1 1/2-inch sockets.

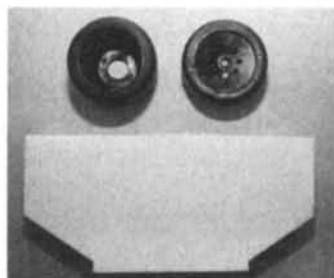


A new label and a new can highlight Trinity's Point Blank motor. The special-order can is machined out of solid steel billet, features an aluminum endbell and can be wound to your specifications. Invitational TQ Joel Johnson used a 12-turn quad in his car.



## Bolink LTO XL

In its new oval LTO XL chassis, Bolink\* leaves the battery position totally up to you. There are five options: three front-to-back and two side-to-side positions. The racer also features an Associated\* front end, a T-plate-type rear with two balls, a single shock damper tube for lateral control and a 0.110-inch-thick carbon-fiber chassis.

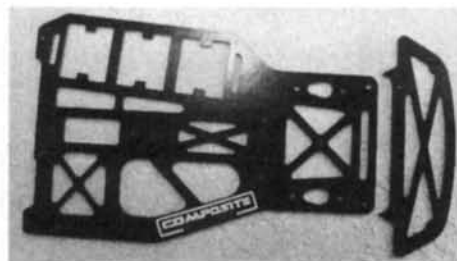


ovals, because it provides slightly better traction than the Gold dot, and it wears better. The Purple is for very slippery asphalt and concrete tracks. Both are available in front and rear and in L1, Standard and R1 configurations.

Available in 1/10 and 1/12 scales, TRC's new front-end bumper is a must. Made of super-light foam, it can easily be shaped to fit inside any body.

## Composite Craft Chassis

Composite Craft's\* R&D manager Bobby Horan premiered their Ultra-Lite series carbon-fiber/graphite chassis, which is 13 grams lighter than stock and is available to fit the 10L SS.

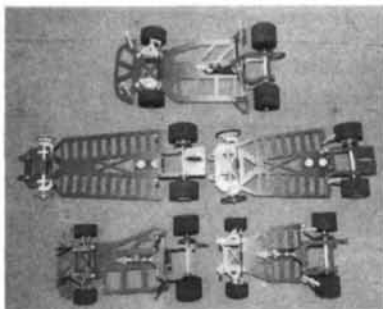


## RRP Batteries

Now in business for about six months, Tony Stepp and his crew at Radical Racing Products\*, produced the winning batteries for the Novak Invitational 500. Tony says he believes in performance—not numbers—and he sends



out matched cells that run fast and last long. All we have to do now is find out his secret!



### PTI/Hyperdrive

Five new R/C racing choices are available from PTI/Hyperdrive\*. The SSE 12 is available in both oval and roadcourse versions. The oval version's batteries are on the left, and it features an Associated front end, aluminum hubs and a fiberglass axle. The 1/10-scale SSE Oval was

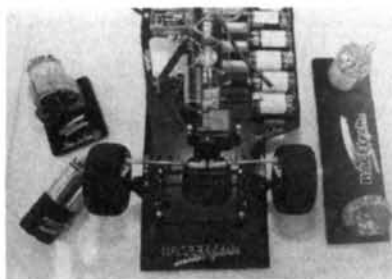
designed for entry-level racers, and it's competitive right out of the box. Four chassis designs will be available to suit different types of track. For the drag racers out there, the FC1 funny car and PS1 Pro Stock make their debut. They have symmetrical chassis, fiberglass rear axles, machined hubs and machined-nylon front wheels.



### Raceway Mfg.\* Aluminum A-Arms

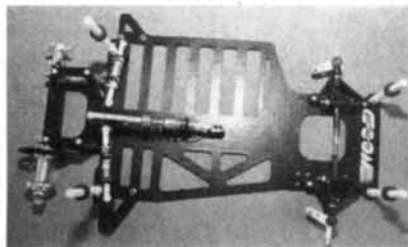
Orlando manufacturer Ron Norton always has a trailer packed with racers who are eyeing his wares.

His newest offerings include aircraft-aluminum lower A-arms and an aluminum front brace that helps to prevent them from flexing. All of his parts are designed to help your vehicle shed weight.



### Racetech Caster Kit

From Racetech\* come several neat new items. A caster kit allows you to easily make super-fine tuning adjustments, and a brush-contouring tool allows you to pre-seat a brush and convert conventional brushes into laydown and vice versa. There's also a motor break-in stand (with fan), an acrylic motor holder and a non-slip car stand.



### Mighty Modified Motors

High quality and personal testing are what set Mighty Modified\* products apart. Before any motor is shipped, it has to be approved by owner Nick Themelis. Available in almost all winds and configurations, the Mighty Modified has a lot of titles to its credit.

### Racing X-13

Mike Wood Sr. and Mike Wood Jr.—owners of

Wood Racing\*—showed me their new X-13 oval car. Running for the first time, the racer proved its capabilities by winning the Oval Masters 500-lap race. According to Mike Sr., the car's weight distribution is fully adjustable (front to rear; left to right), and it has an adjustable wheelbase, a full floating suspension, an offset front end and a 0.110-inch-thick graphite chassis. Well-known in the Midwest, the Woods will soon be known nationally because of this victory.

## Two More Titles

In addition to the five racing-class titles, two more were up for grabs. The TQs in the five events got trophies as winners of the Bolink Clash.

Also up for grabs was a camcorder provided by PSE. All you had to do was win the PSE Dash.

The top four amateur mod qualifiers, the top four Novak 500 qualifiers and the TQs in the Novak 200 and 4-minute Invitational all made the competition. During the eliminations, two drivers went head-to-head for 2 minutes, and the three drivers who survived took part in the main event. Invitational driver Chris Smith edged past Jason Alderman and Mike Boylan to take home the top prize.

### THE MAINS

Sunday was beautiful!—sunny and breezy. To ensure that the A-mains would be completed before the sun went down, they were run first (a nice touch).

• **Stock.** Driving his Associated 10LSS with a Parma handout motor, David Jones went from fifth to take the checkered flag with 40 laps in 4:03.18. Florida resident Mark Bergman was second, and Glenn Kaeser finished third, beating his brother Bryan, who placed seventh.

• **Amateur Modified.** Jason Alderman proved his TQ wasn't a fluke by winning with 44 laps in 4:07.17. Chuck Wade came from eighth to take second; Larry Flowe finished third.

• **Invitational.** All eyes were on Joel Johnson, who had won countless other titles, but had never taken home a first-place trophy from the Whipp. This year, he could not be denied. He led from start to finish and won with 46 laps in 4:50.73. He made the buzzer for his 46th lap, but he dumped on his final time around for a 50-second lap time—very close indeed. Chris Smith placed second with 45 laps, and David Pulfer finished third with 44 laps.

• **Enduros.**

—*Novak 200.* As the pit crews and spotters took their places, the amateur drivers lined up. This race requires a combination of nerves of steel, stamina, dependable

equipment and, of course, a lot of luck. With five mandatory pit stops, getting into and out of the pits quickly was extremely important.

Mechanical problems sidelined TQ Jason Alderman after 1:30, but eighth-place qualifier Jeremy Kornblatt put it all together to win with 200 laps in 19:44.64. He was followed by Chris Brimmer and—five laps down—Todd Braun with 179 laps. The top three spots went to the eighth, sixth and seventh qualifiers.

—*Novak Invitational 500.* Time for the sport's big boys! Driving a brand-new Wood Racing X-13, Jimmy Simmons, showed that a 2½-year layoff hadn't hurt his driving skills, and his flawless pit crew gave him the edge he needed for victory in 49:07.57. With a really great effort, Bolink's Rick Jordan placed second by edging out Josh Cyrul by 3 seconds. That was after almost 50 minutes of racing—a real heart-stopper.

With non-stop racing and a festival atmosphere, this year's Masters was a blast. The only real difference between this and a NASCAR event is that the cars are only 1/10 scale. Best of all was the sportsmanship displayed and the chance it gave us all to make new friends.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 200.







# The Great Big Sedan Slam

## Which car is for you?



by RCCA Staff

**R**IGHT NOW, parking-lot racing is one of the hottest (if not *the* hottest) segments in R/C. There are many types of parking-lot racers, including F1s, GTP cars and sedans, but the sedan class currently seems to have the most momentum and appeal. Most of the manufacturers that are involved in parking-lot racing offer some type of sedan—either entry-level or full-blown racer. With so many choices on the market, choosing the right car tends to be confusing. Well, to help you buy the proper parking-lot pounder, we've gathered 12 of the hottest available sedan racers. Most of them are available with several body and wheel styles, but the chassis are basically the same. Our editors: Frank Masi, John "Doogie" Howell and John Huber spent quite a bit of time with all of the sedans and are prepared to give you their opinions on each one.

*For your convenience, the addresses of the companies asterisked here are listed alphabetically in the Index of Manufacturers on page 200.*

## Sizing Up the Difference

**S**cale...What the heck is scale? When we started to do this sedan slam, we said OK, let's get all the  $\frac{1}{10}$ -scale sedans together and do it up...simple, right?—*not!* When the cars began to arrive, we saw that there was something weird going on. Some cars were big and some were small; what was the deal? It seemed as if every manufacturer uses a different formula to come up with the dimensions of their car.



Tamiya\* sedans have always seemed scale to us. We measured the wheelbase of the Castrol Civic and then ran outside to measure the wheelbase of a Civic in the parking lot. The Tamiya model has a wheelbase of 10.20 inches, which, when multiplied by 10 equals 102 inches. The actual full-size car wheelbase measures 101 inches.

We were surprised by the size of the cars from Schumacher\* and Kyosho\*. The Kyosho Alfa and Mercedes were as large as a Tamiya  $\frac{1}{8}$ -scale gas car. The Schumacher's size was somewhere between the Kyosho and Tamiya. But, strangely enough, the Kyosho Celica was more in tune with the other Tamiya cars and was way smaller than the other Kyosho cars.

So what does all this mean? We don't know. But if you are going to race with a bunch of buddies, be sure to take similar models, or the car with the biggest body will bonk yours around!



# Sedan Slam

## 4WD

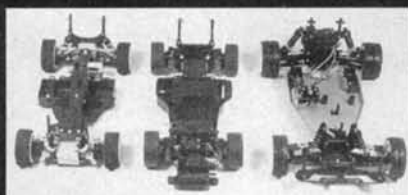
VS.

## FWD

VS.

## RWD

One option to consider when you buy a sedan is which type of drive train you want: a front-wheel-drive (FWD), rear-wheel-drive (RWD), or four-wheel-drive (4WD) system.



### Front-wheel drive

These are a little quirky to drive, but once you get used to them, they're a total blast. They tend to pull a little to one side when you nail the throttle. This is known as torque steer. If you run an ESC that has a current limiter, try to set it up so that the car doesn't explode off the line with a burst of acceleration. The cars also have awesome braking power (they stop on a dime) and excellent cornering capability. The front-driven tires pull the car through turns, but if you go into a corner too hot, the rear tires tend to lift and make the car spin out. There is only one gearbox, so power loss is minimal.

### Rear-wheel drive

These tend to be pushed, rather than pulled through turns. They're a bit more stable through turns than FWD cars, but they don't handle as responsively. They spin out less frequently than a FWD car because the motor and gearbox are toward the rear.

### Four-wheel drive

These are the most stable of the bunch; punch the throttle and hang on. The drive-train system is more complex and requires more maintenance, and there are more gears through which to lose power. Yet most racers feel that the 4WD system gives them a distinct advantage over the other cars, and the minimal power loss through the gear train isn't important to them. Spinouts are minimal because all four wheels constantly claw at the pavement.

## Tamiya TA01

**Doogie:** For someone who wants to give sedan-style parking-lot racing a shot without spending a ton of money, this is a pretty good choice. It's reliable and durable, and it costs a little less than Tamiya's more advanced TA02 chassis. It costs less, but it doesn't handle as well. The plastic shocks are good units, but I'm not impressed with the drive-shaft setup. I found the drive shaft tends to wobble a bit, but it can be replaced by a stiffer aftermarket unit if you feel it's necessary. Overall, it's a pretty good kit.



LIKE

**Frank:** This is the "granddaddy" of sedans, so for sentimental reasons, it's hard to judge objectively. It comes with a lot of cool body styles, but the TA02 and TA02W chassis are more modern and handle better. Shocks work great; the drive train is really sealed against dirt. Gear ratios are really limited, and you have to use metric pinion gears. Like all Tamiya chassis, there are tons of aftermarket goodies available, so you can customize yours however you want.

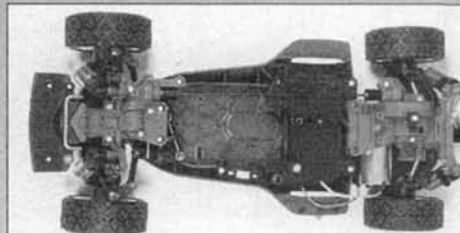


LIKE

**John:** This is the first available 4WD sedan-type chassis. It has a strong honeycomb chassis with beefy tranny at each end. Its arms are a little narrower than the arms on the 02. Steering links are fixed, so toe-in isn't adjustable (which I don't like). I do like the quick-access gear covers that allow easy maintenance. The 01 chassis come in both on- and off-road configurations.



LIKE



#### DIMENSIONS

Length (overall)	17.25 in.
Wheelbase	10.25 in.
Front width	5.75 in.
Rear width	6 in.

**WEIGHT (gross, RTR)** .....3 lb., 7.75 oz.

#### CHASSIS

Type	1-piece tub frame
Material	Plastic

#### DRIVE TRAIN

Type	Gear
Transmission	Secondary gear/shaft
Differential(s)	Front gear/rear ball
Slipper clutch	None
Bearings/bushings	Bushings

#### SUSPENSION (F/R)

Type	A-arm w/upper link
Damping	Oil-filled, coil-over shocks

#### WHEELS (F/R)

Type	1-piece nylon
Dimensions (DxW)	2x1 in.

**TIRES (F/R)** .....Rubber slicks

**LIST PRICE**.....\$247

## Tamiya TA02 FWD

**Doogie:** This is my favorite Tamiya sedan chassis. The front-wheel drive car accelerates quickly, stops on a dime and basically "drives" just like a full-size FWD car. If you "cook" it into turns too hot, the rear will spin out because most of the chassis' weight is toward the front. I had a problem overcoming torque-steer situations. I run a Trinity Green Machine 2, and the added power makes the car veer to the left under hard acceleration. I countered it by dialing in my ESC's current limiter so that power to the front wheels is limited off the line. Other than that minor glitch, I love the car. It's a blast to drive.



LOVE

**Frank:** I love this car because it's so front-end happy! It "drives" just like a real FWD car; the front wheels push and pull the car all over the place. Once you get used to driving it, you can be competitive against your friends and their 4WD chassis. I recommend the FWD to younger builders because its drive train is so simple to put together. A front-mounted motor and gearbox are bolted to the same chassis and suspension geometry as the TA02 4WD. Cool bodies such as the Honda Civic make this chassis even more appealing.

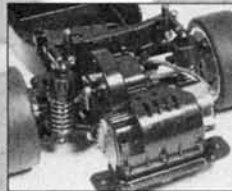
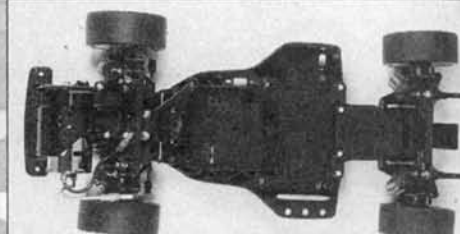


LOVE

**John:** A truly different driving experience makes this chassis one of my favorites. It's exactly the same as the 02, including the arms, but it has toe-out on the rear arms. Because the motor is right in the front end, it seems as if it could be damaged easily, but after several months of serious bashing, mine is still holding up fine. All Tamiya kit bodies are very scale and come with great decals.



LOVE



# Tamiya TA02W

## DIMENSIONS

Length (overall) .....15.75 in.  
Wheelbase .....10.1 in.  
Width (F) .....7.25 in.  
Width (R) .....6.5 in.

WEIGHT (gross, RTR) .....3 lb., 7.75 oz.

## CHASSIS

Type .....Molded bathtub style  
Material .....High-impact molded plastic

## DRIVE TRAIN

Type .....Sealed drive train  
Transmission .....Secondary gear/shaft  
Differential(s) .....Front gear/rear ball  
Slipper clutch .....None  
Bearings/bushings .....Metal and plastic bushings

## SUSPENSION (F/R)

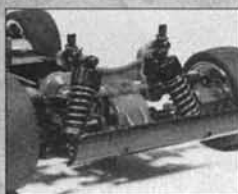
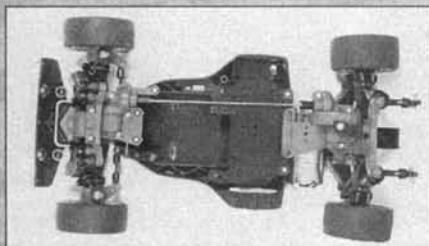
Type .....Independent double-wishbone  
camber links  
Damping .....Plastic oil-filled,  
coil-over shocks

## WHEELS (F/R)

Type .....1-piece molded w/ insert  
Dimensions (DxW) .....2x1 in.

TIRES (F/R) .....Rubber slicks

LIST PRICE .....\$285



**Doogie:** Basically, I feel the same way about the TA02W as I do about the TA01, but because it's a little wider, it's obviously more stable at speed. Tamiya is heading in the right direction to make a really competitive sedan, but they need to add the "tunability" factor that we find on other sedans. Who knows? Maybe we'll see a slightly more adjustable TA03 some-time soon.



LIKE

**Frank:** Kinda cool, but not typical Tamiya. I say this because I've come to expect so much from Tamiya, and this "wide" conversion for the TA02 is so simple: they've put on the wider front wheel hubs from the TA01 and added wheels with different offset. Looks very scale for IMSA-type bodies. Because it's wider, it will handle better than the other 4WD Tamiya chassis.



LIKE

**John:** Basically exactly the same chassis as the 02, but with wider front hubs (from the TA01) and wider rims and tires in the rear. I love the chrome 2-piece BBS rims on the Nissan 300ZX. The wider rear tires and overall width will surely help stability, but it could have been done in a more advanced fashion by retaining the offset in the rims (like those on the first 02). It includes the great plastic shocks that come with all Tamiya sedans.



LIKE

# Tamiya TA02

**Doogie:** Basically an updated TA01 design, its chassis has many of the same features, but the small change made to the platform makes a big difference in the handling department. Rear-swept suspension arms allow the gearbox and motor to be mounted in a more "mid" configuration. The battery is mounted more forward, and that also helps to improve handling. I like the fact that some Tamiya TA02 kits come with 3-step mechanical speed controls; it helps enthusiasts get up and going quicker and at less expense. As with all Tamiya kits, the quality is excellent, and buying the TA02 would be a step toward getting a better overall parking-lot racer.



LIKE

**Frank:** This chassis has everything that I like about the TA01, but it also offers better handling and even more body styles. They've moved a lot of the car's weight toward its center, so the 02 will react a little faster to steering input. Although I haven't tested this, I assume that this chassis will accelerate a little quicker than the TA01 because it will "squat" less.



LOVE

**John:** The second generation of Tamiya sedan chassis has several features that are different from those on the 01. The layout brings the rear gearbox and battery forward for better weight distribution and uses swept-back arms to retain the wheelbase of the 01. The front and rear arms are both a little wider and are offset more inside the rims. It has the same wimpy drive shaft as the 01, but it works. Several different body styles make this a hit with everyone.



LOVE

## DIMENSIONS

Length (overall) .....16.0 in.  
Wheelbase .....10.20 in.  
Width (F) .....7.25 in.  
Width (R) .....7 in.

WEIGHT (gross, RTR) .....3 lb., 3.3 oz.

## CHASSIS

Type .....Tub  
Material .....Plastic

## DRIVE TRAIN

Type .....Gear  
Transmission .....Gear  
Differential(s) .....Ball  
Slipper clutch .....None  
Bearings/bushings .....Plastic and metal bushings

## SUSPENSION (F/R)

Type .....4W Independent w/non-adjustable  
camber links  
Damping .....Plastic oil-filled, coil-over shocks

## WHEELS (F/R)

Type .....1-piece plastic  
Dimensions (DxW) .....2x1 in.

TIRES (F/R) .....Semi-pneumatic street tread

LIST PRICE .....\$260

## DIMENSIONS

Length (overall) .....18 in.  
Wheelbase .....10.1 in.  
Width (F/R) .....7 in.

WEIGHT (gross, RTR) .....3 lb., 2 oz.

## CHASSIS

Type .....Tub  
Material .....Plastic

## DRIVE TRAIN

Type .....Gear  
Transmission .....Gear  
Differential(s) .....Ball/bevel gear  
Slipper clutch .....None  
Bearings/bushings .....Metal and plastic bushings

## SUSPENSION (F/R)

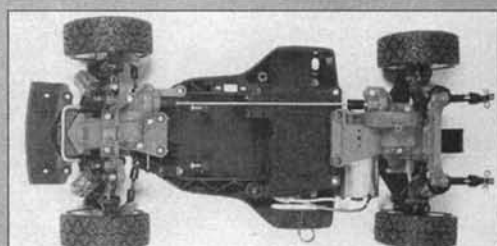
Type .....4W Independent w/fixed upper link  
Damping .....Oil-filled, coil-over shocks

## WHEELS (F/R)

Type .....1-piece plastic  
Dimensions (DxW) .....2x1 in.

TIRES (F/R) .....Semi-pneumatic slicks

LIST PRICE .....\$268





# Sedan Slam

## AFTERMARKET HOP-UPS

You've run your sedan into the ground and want to improve its performance and adjustability. Who do you turn to? Here are a few companies that should be able to help you hop up your ride:

**HPI.** The good folks at HPI\* offer tons of parts, including chassis, lowering kits, one-way diffs, bodies, etc., for Tamiya TA01 and TA02 sedan chassis in both 4WD and FWD configurations. They also offer tires and wheels in a variety of styles. HPI is on the cutting edge of the parking-lot racing scene, and they're always coming up with new products for parking-lot racers.

**Japan R/C Imports.** Japan R/C Imports\* has all the latest Kose (a Japanese aftermarket company) aluminum hop-up parts for the Tamiya sedan series: trick carbon-fiber drive shafts; aluminum suspension arms and hubs; aluminum bulkheads; one-way diffs; aluminum shocks; graphite chassis, and more. All the aluminum Kose parts come anodized in brilliant colors to give your ride that trick "factory ride" look. Trick Yokomo parts are also available.

**Kyosho.** Kyosho not only manufactures car kits, but they also offer some pretty impressive hop-up parts for their cars. They have all sorts of wheels and tires, assorted bodies, shocks, bearing kits and even a cool 2-speed transmission for the Spider 4WD. Check with Kyosho's distributor, Great Planes, for more info on hop-up items.

**Tamiya.** Tamiya also produces a line of hop-up parts for their cars. This line includes graphite chassis, ball diffs, bodies, hotter motors, aluminum-body shocks, various wheels and tires (they have these really intense aluminum wheels that you have to see to believe) and much more.

**Yokomo.** Yokomo's\* car—the YR-4—is one of the most advanced sedans on the market. To make the car perform even better, the company produces a ton of hop-up items: a graphite chassis set, a one-way drive-hub adapter, a variety of compound rubber and foam tires, shock springs, shock oils of several viscosities, titanium screw sets and a 2-speed tranny, to name a few.

## Yokomo YR-4

**Doogie:** When I reviewed the YR-4 a while ago, I was really impressed with it. When you look at the car, you know it

was designed with one purpose: to win parking-lot races. The diffs are killer, the shocks are awesome and so is the belt-drive system. Heed my warning though: if you run on unswept pavement, either pick another car or seal the YR-4's drive train somehow. Pebbles love to lock up—and grind away at!—the belt-drive system. For all out-and-out racing, though, this is the car. Another plus is that Yokomo offers tons of really killer parts for it; they include a 2-speed tranny, a graphite chassis set and all sorts of titanium hardware.

**Frank:** I want to love this car, but one thing gets in the way: sand and grit seem magnetically attracted to the rear belt and diff area. I've raced off-road versions of this car for years and have had very little problem with dirt. I can only assume that the off-road version's Lexan undertray really keeps the crud out. My advice: fit an undertray to your YR-4. Other than this quibble, I love this car. In my opinion, its suspension and drive train make it superior in performance to any other "narrow" sedan chassis, and the sheer number of cool hop-ups offered by Yokomo is staggering. A 2-speed is available, too!

**John:** This is, without a doubt, one of my favorite cars. It has the drive-train design that has won numerous world titles in off-road, but it has been redesigned to be more scale. A slew of aftermarket parts, including a 2-speed tranny, are available for it, and that's sure to make it a hit with those who love to soup up. The only apparent drawback is that, on a dirty course, the exposed belts can be jammed with small rocks. And it's a little more expensive than some of the others. It is, however, a very high-quality car.



LOVE



LIKE



LOVE

## Kyosho SPIDER 4WD

**Doogie:** This is definitely Kyosho's best sedan. It's narrow, more nimble than the others and is the most race-worthy. It's completely adjustable, and of the three Kyoshos featured here, it's the most scale-looking. Even the shocks have adjustable spring-preload collars. The included gear diffs can be easily upgraded to ball diffs, and the belt-drive system is very efficient. I have only one minor dislike: I'm not crazy about the aluminum chassis. I'd like to see the Spider decked out with a lighter fiberglass unit. Other than that, it's a really cool car for which there are some pretty trick available hop-ups, including a 2-speed tranny.



LIKE

**Frank:** I can't help it. I loved Kyosho's Optima Mid 4WD buggy! And now they've brought it back to life as a really bitchin' touring car chassis. The Mid's chassis and drive train were bulletproof in the dirt, so I'm sure that the parking lot poses little threat to the Spider's durability. Kyosho also went all out on the conversion from buggy to sedan; short arms and a killer body make this Kyosho's best scale effort. Doogie hates the aluminum chassis, but I think it adds to the look of the car. Besides, any of the hundreds of add-ons that Kyosho and other manufacturers make for the Mid will fit this car—including graphite chassis. The optional 2-speed tranny rules.

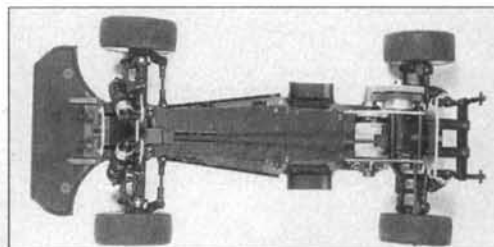


LOVE

**John:** This is definitely Kyosho's most scale chassis. It's based on the Optima Mid chassis and, as such, has many options already available for it. The most noteworthy addition is the 2-speed tranny. Though it's probably illegal for sanctioned racing, the 2-speed is sure to be a hit with people who run for fun. The Kelron shocks, which come with adjustable spring tensioners, have been known to be decent for years.



LIKE



### DIMENSIONS

Length (overall)	18 in.
Wheelbase	10.25 in.
Width (F)	7.5 in.
Width (R)	7.75 in.

**WEIGHT (gross, RTR)** .....3 lb., 4.1 oz.

### CHASSIS

Type	Flat pan
Material	Aluminum

### DRIVE TRAIN

Type	Gear/belt
Transmission	Belt
Differential(s)	Gear
Slipper clutch	None
Bearings/bushings	Bushings

### SUSPENSION (F/R)

Type	Lower A-arm with adjustable upper link
Damping	Oil shock

### WHEELS (F/R)

Type	1-piece plastic
Dimensions (DxW)	2x1 in.

**TIRES (F/R)** .....Semi-pneumatic rubber slicks

**LIST PRICE**.....\$219.99

#### DIMENSIONS

Length (overall).....14 in.  
Wheelbase.....10.25 in.  
Width (F/R).....7.13 in.

WEIGHT (gross, RTR).....3 lb., 3 oz.

#### CHASSIS

Type.....Plate  
Material.....Black fiberglass

#### DRIVE TRAIN

Transmission.....Belt drive  
Differential(s).....Ball  
Slipper clutch.....None  
Bearings/bushings.....Bearings

#### SUSPENSION (F/R)

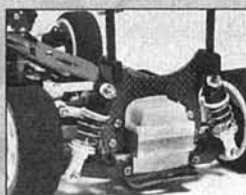
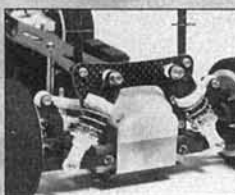
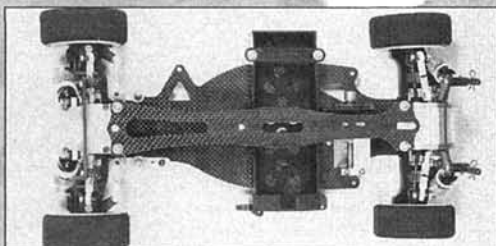
Type.....Lower A-arms with upper control links  
Damping.....Oil-filled, coil-over shocks

#### WHEELS (F/R)

Type.....6-spoke, ABS plastic  
Dimensions (DxW).....1.875x1 in.

TIRES (F/R).....Foam

LIST PRICE.....\$269 (w/out body)  
\$310 (w/ body)



## Kyosho OUTRAGE TOURING CAR

**Doogie:** Here's another example of an entry-level off-road buggy turned sedan. Like the Lazer Alpha, it's relatively non-adjustable. On the plus side, it isn't expensive, and it comes with a motor and a mechanical speed control, so you're up and running pretty fast. And, once again, it's just too darn big.



DISLIKE

**Frank:** I think that this is the least expensive sedan mentioned in this feature. It's basically Kyosho's Outrage 2WD buggy with street-type wheels and tires bolted onto it. Once the good-looking but way too big Mercedes body is mounted, you can't tell it's a buggy; it looks really hot (until you see it alongside one of the more scale-looking cars). The Outrage has fully independent suspension that isn't really adjustable. But if this car is aimed at beginners, it shouldn't offer too many adjustments, which might cause confusion. Anyway, it's easy to upgrade to turn-buckles 'n' such later on.



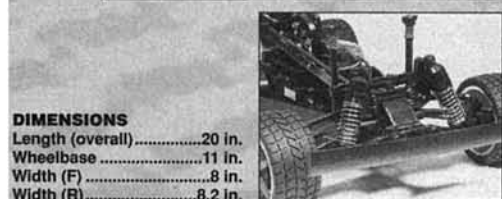
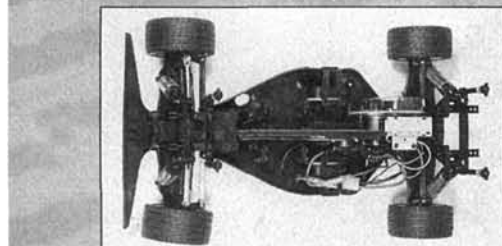
LIKE

**John:** This chassis is basically an Outrage buggy with tires and rims similar to the ones on the Alpha Lazer. It was designed to be low buck and, to me, this shows. Though it does come with a mechanical speed control and motor, which is good for beginners, it's also very large (like the Alpha Lazer), so it will look out of place with some cars. Since it's based on an off-road buggy, its suspension is pretty good, but as a sedan, it probably won't get used to its full potential.



DISLIKE

## Kyosho LAZER ALFA ROMEO 155 V6II



#### DIMENSIONS

Length (overall).....20 in.  
Wheelbase.....11 in.  
Width (F).....8 in.  
Width (R).....8.2 in.

#### WEIGHT

(gross, RTR).....3 lb., 9 oz.

#### CHASSIS

Type.....Tub  
Material.....Keltron

#### DRIVE TRAIN

Type.....Belt  
Transmission.....Belt  
Differential(s).....Gear  
Slipper clutch.....None  
Bearings/bushings.....Bushings

#### SUSPENSION (F/R)

Type.....Lower A-arm with fixed upper link  
Damping.....Oil-filled, coil-over shocks

#### WHEELS (F/R)

Type.....2-piece plastic  
Dimensions (DxW).....2.3x1.4 in.

TIRES (F/R).....Semi-pneumatic radial tread pattern

LIST PRICE.....\$219.99

**Doogie:** This is a decent 4WD, but if your only goal is parking-lot racing, you might want to look at Kyosho's Spider chassis instead. The Alpha Lazer's downside is its lack of adjustability out of the box; its fixed links make camber and caster non-adjustable. On the plus side, the Alpha Lazer has a good belt-drive 4WD system and smooth gear diffs. The included mechanical rotary speed control is better sealed than Tamiya's 3-step unit, and it should, in theory, last longer. The car is definitely not scale. Overall, though, it's a good first-time car for those who want a slightly larger vehicle.



LIKE

**Frank:** This car, and Kyosho's Outrage, are parts-bin sedans, meaning that they are essentially off-road chassis that have on-road wheels and sedan bodies. The plus side is that they're really wide, so they'll handle like a full-on road-racing chassis (such as a 10L). On the minus side, they don't look as scale as the narrow sedans, like Kyosho's own Spider chassis. With its race-proven 4WD system straight from the Lazer buggy, I think that the Alpha offers a lot of performance for little money. Also, I bet that most hoppers for the Lazer buggy can be bolted right onto this car.

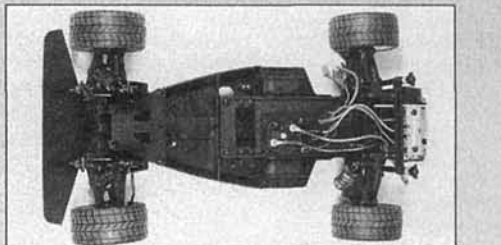
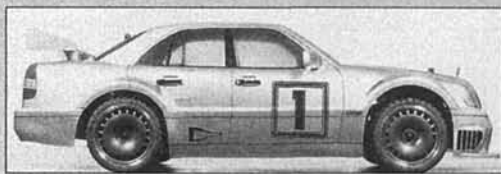


LIKE

**John:** This looks like a decent 4WD car for a beginner who doesn't have racing in mind. Its drive system and suspension are superb, but its scale is way off. With the body on the chassis, the car is as big as some 1/8-scale cars. I like the wheels with the inside disk brakes and the treaded tires, and it looks as if other 2.2-inch treaded tires will fit the rims as well. The non-adjustable steering and camber links are the right length, but adjustable ones would be my choice.



LIKE



#### DIMENSIONS

Length (overall).....19.4 in.  
Wheelbase.....10.9 in.  
Width (F/R).....8.1 in.

#### WEIGHT

(gross, RTR).....3 lb., 4 oz.

#### CHASSIS

Type.....Tub  
Material.....Keltron

#### DRIVE TRAIN

Type.....Gear  
Transmission.....Gear  
Differential(s).....Gear  
Slipper clutch.....None  
Bearings/bushings.....Bushings

#### SUSPENSION (F/R)

Type.....Lower A-arm with fixed upper link  
Damping.....Oil-filled, coil-over shocks

#### WHEELS (F/R)

Type.....2-piece plastic  
Dimensions (DxW).....2.3x1.4 in.

TIRES (F/R).....Semi-pneumatic radial tread pattern

LIST PRICE.....\$169.99



# Sedan Slam

## TIPS & TIRES

### Aftermarket Tires

by Doug Mertes

Many manufacturers make treaded tires and slicks for sedans in various compounds, widths and designs. Here are some tips to follow when looking for new sedan tires:

### TIPS

- Sticky front tires increase turn-in on tight roadcourses, yet they may shorten tread life. You should use them with hard-compound rear tires, which prevent the car from pushing under power. But be aware that you can reduce rear traction too much and that causes spinouts under power and in the tight turns that inevitably follow fast straightaways.
- To prevent these sticky tires from collapsing under the car's weight and in corners, and to press the entire tread width against the asphalt, mount them with sponge foam liners (if provided). To prevent the foam from balling up, glue it to the inside of the tire (not the rim!) with a little contact cement. Be sure to glue the tires to the rims, or the tires will come off the first time you take a tight corner. Thin CA works well for this; just be sure to let the glue cure before you turn the tire over to do the other side.

Most of the available sedan tires and wheels are interchangeable, so experiment. You may, however, want to check with the manufacturers about compatibility. Here are some of the choices available to you:

### TIRES

#### Pro-Line

• Sedan Hawks. These Pro-Line\* tires (no. 1066) are based on the successful Road Hawk series. Pro-Line's super-sticky XT-R compound gives them that extra traction and stopping power on unprepared and dirty paved surfaces. Pro-Line will soon release a replacement wheel for Tamiya cars that's designed to fit the Sedan Hawks.

#### HPI

• Super Radials. HPI sells these treaded tires in narrow (no. 4510) and wide (no. 4511) versions. They look great mounted on HPI's new 7-spoke chrome rims (no. 3558—narrow; no. 3570—wide).

• Super Slicks. HPI's narrow (no. 4515) and wide (no. 4516) slick tires offer slightly longer life and a little more grip than the Super Slicks from Tamiya. Optional wide rear tires give the driver an additional tuning aid.

#### Tamiya

• Treaded tires. These kit-based treaded tires are sold as aftermarket add-ons. I've mounted them on Tamiya's one-piece, chrome-plated truck-series wheels, and under normal street conditions (unswept, dusty and dirty) street conditions, they work very well.

• Slicks. These stock-kit slicks do a great job on fairly clean, prepared asphalt and concrete, especially if the weather is hot.

• M-Grip Super Slicks. You can get more traction with these (no. 53178), and they can be used with other slick tires to increase or decrease traction at one end of the car to balance handling.

• Super Slicks. These (no. 53133) grip better than any of Tamiya's other racing tires. They may last for only five or six runs on an abrasive surface, but they offer superior traction.

#### Hot Shoes

• Street Gripper. Hot Shoes\* is a relatively new tire company. The slick tire that they offer comes in a wide or a narrow version; both feature Hot Shoes' super-soft TAC compound.

#### Yokomo

• Hot Laps. This tire features a super-soft compound and like all the other tires mentioned, it will fit any sedan wheel.

#### Kyosho

• Low-profile radial. These offer good traction on pavement, and they don't wear too quickly.

• Radial Pattern A. These were included in the old Corvette ZR-1 kit, and they feature an A-type radial pattern and have a semi-tall sidewall design.

• Radial Pattern B. With a less aggressive radial pattern and a lower-profile sidewall, these tires are beneficial on smooth, clean track surfaces.

• Standard Slicks. These have a relatively firm compound and don't wear very quickly.

• High-Grip Slicks. With their softer compound, these grip the pavement better than Standard Slicks do.

## Schumacher CAT 2000 TOURING CAR

### DIMENSIONS

Length (overall) ..... 18 in.  
Wheelbase ..... 10.95 in.  
Width (F) ..... 9.53 in.  
Width (R) ..... 9.45 in.

WEIGHT (gross, RTR) ..... 3 lb., 9 oz.

### CHASSIS

Type ..... Double deck  
Material ..... Fiberglass

### DRIVE TRAIN

Type ..... Belt  
Transmission ..... Belt  
Differential(s) ..... Ball  
Slipper clutch ..... Optional  
Bearings/bushings ..... Ball bearings

### SUSPENSION (F/R)

Type ..... Independent wishbone  
Damping ..... 4 oil-filled shocks

### WHEELS (F/R)

Type ..... 3-spoke  
Dimensions (DxW)  
—Front ..... 2.2x1 in.  
—Rear ..... 2.2x1.3 in.

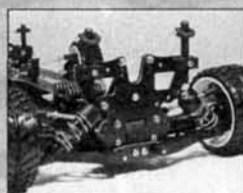
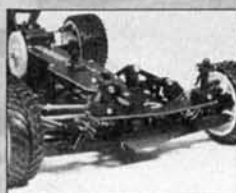
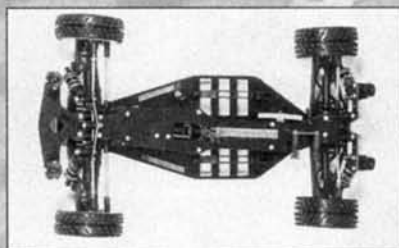
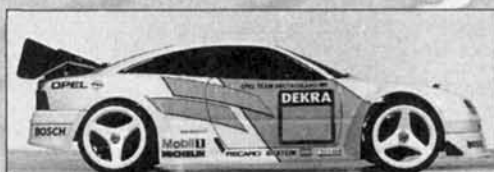
TIRES (F/R) ..... RT3 on-road

LIST PRICE ..... \$479.50

**Doogie:** One trick ride. Its coaxial drive shafts provide smooth acceleration, and its belt-drive system is on a par with the Yokomo YR-4's (a feat I didn't think possible). The car is feature-filled: a unique belt tensioner, a built-in motor-plate heat sink, ball diffs and aluminum shocks. On the downside, it's pretty expensive. Make no mistake though; it's a full-blown racecar. Also, it definitely isn't true to scale. The Schumacher car line is similar to Kyosho's lineup—much bigger than Tamiya's. Overall, if you're looking for a racer, you might want to check this one out, too.

**Frank:** I'd pick this car in a race anyway! It's based on Schumacher's top-line 4WD buggy chassis—the CAT 2000—and it sports the same geometry and stance as its off-road bro'. Front and rear ball diffs, heavy-duty shocks and suspension arms, and a stiff chassis make this car a winner. For me, it boils down to appearance. I'm split: I really like the scale looks of the narrow sedans, but when this car's Opel Calibra body is fitted, man, it looks mean!

**John:** One of the most advanced designs in the group. However, this is another car that fits in the category of larger than 1/10 scale and smaller than 1/8 scale. The chassis has many of the top features you'll find on world-class cars: ball diffs; high-quality slider drive shafts; and a heat-sink motor plate. It accepts only saddle packs, so it isn't for beginners, and the exposed belts might be jammed by small rocks. If the Cat 2000 had a slightly narrower suspension system and looked more scale, I'd pick it as my favorite.



LIKE



LOVE



LIKE

## Schumacher CLUB 10 TOURING CAR

and it has a pretty sturdy, yet light, aluminum chassis. The belt-driven tranny is smooth and efficient, but it can be difficult to set up. The Club 10 2WD is more expensive than its competition, but it also has more features and is more adjustable. If you want a RWD sedan, you have to decide whether or not you also want to spend more.

**Frank:** This is Schumacher's old Cougar 2WD buggy. It's as durable and as adjustable as any top-line buggy, but its tranny is a little more difficult to build than a gear-type. I like the look of its aluminum chassis, and all of its molded parts are topnotch. Rear wheel drive sedans provide realistic, "tail-out" excitement and they can do donuts! Like the Bosscat, the Club 10 includes a mechanical speed control and stock motor.

**John:** This chassis has its roots in the dirt, as do the other Schumacher cars (except for the Wildcat). It's based on the Cougar 2WD buggy chassis and, once again, it's a little out of scale. With the included oil-filled shocks and ball diff, it's ready for the roughest surfaces. Schumacher's high standards are as apparent in this car as they are in the other cars they adapted from off-road. Apart from the scale deal, I like the car's design and that it comes with a speed control and will accept stick packs.



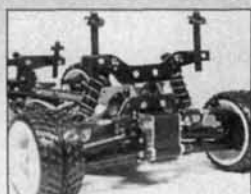
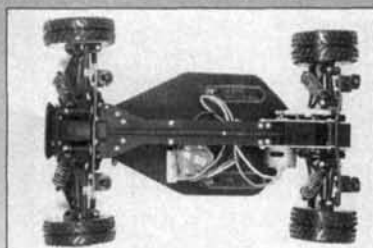
LIKE



LIKE



LIKE



**DIMENSIONS**  
Length (overall) ..... 18 in.  
Wheelbase ..... 10.75 in.  
Width (F) ..... 9.21 in.  
Width (R) ..... 9.45 in.

**WEIGHT**  
(gross, RTR) ..... 3 lb., 10 oz.

**CHASSIS**  
Type ..... Double deck  
Material ..... Fiberglass

**DRIVE TRAIN**  
Type ..... Belt  
Transmission ..... Belt  
Differential(s) ..... Ball diff  
Slipper clutch ..... Optional  
Bearings/bushings ..... Bushings

**SUSPENSION (F/R)**  
Type ..... Independent wishbone  
Damping ..... four oil-filled shocks

**WHEELS (F/R)**  
Type ..... 3-spoke  
Dimensions (DxW)  
—Front ..... 2.2x1 in.  
—Rear ..... 2.2x1.3 in.

**TIRES (F/R)** ..... Semi-pneumatic  
**LIST PRICE** ..... \$249.50

**John:** A refined version of the Schumacher Cat that has been around for years. It has a very smooth, efficient 4WD drive system, but it's a little complicated to build and maintain. Like the Cat 2000, the Bosscat is based on an off-road buggy, so its scale is a little off. Unlike the Cat 2000, the Bosscat can use a standard stick pack, and the kit comes with a mechanical speed control and stock motor. My favorite feature on this car is the hinged front end that flexes back after a hard hit.

## Schumacher BOSSCAT TOURING CAR

**Doogie:** This is Schumacher's next step down from the Cat 2000 4WD. On the plus side: it's fully adjustable, it has nice suspension, a smooth and efficient drive train, ball diffs, a 3-step mechanical speed control and a motor (included). On the downside: it's more difficult to work on than most other sedans. Keeping the drive train properly aligned and in working order can be quite a task. But when it's running and it's running right, the car is pretty smooth.

**Frank:** This is the same chassis as the Bosscat buggy's. I bet this thing really hums on pavement. I used to race a Bosscat buggy, and it was hard to get the three drive belts aligned properly; I think that's why they switched to a simpler belt layout in the CAT 2000. Once set up properly, the drive train works really well, but it's a little harder to maintain than most. Schumacher offers this car at a really good price, and its performance is outstanding. I don't recommend the Bosscat as a first car unless you're mechanically inclined.



LIKE



LIKE



LIKE

## Schumacher WILDCAT

**Doogie:** I wasn't too sure that this car belonged in this category—until we tested it. It's tough and durable and provides some pretty decent speeds. On the other side of the coin, it has absolutely no suspension, so you'd better be driving on a really smooth surface. On top of all its good points, it's really inexpensive. But, don't buy it to race it; that isn't what it was designed for. It's basically a bulletproof chassis topped off with a sedan body; it's as simple as that. If you want something a little more versatile, some of the competition's sedans are within reach (on average, they're about \$40 to \$50 more) and they offer more for your money.

**Frank:** This must be Schumacher's answer to the Bolink Digger! A simple frame made out of two plastic side rails holds all of the mechanicals. There's a solid rear axle with no suspension, and the only suspension up front is the flexing of the fiberglass axle mounts. With the large sedan body mounted, you can't tell from its looks just how simple this chassis is. But drive the car on anything but a smooth surface, and its lack of suspension becomes apparent. Low price and simple construction are its strong points.

**John:** A very interesting design. It has vertical chassis plates like those on a Bolink Digger, but it's much larger. This is easily the simplest chassis in this roundup (no suspension or diff), but it isn't my least favorite. Simple though it is, it's very sturdy and should survive the most brutal thrash sessions. It comes with a mechanical speed control and a stock motor, and it isn't as slow as I thought it would be. As far as racing goes, I wouldn't want to show up with this unless I knew that there was a separate class for it.

**DIMENSIONS**  
Length (overall) ..... 18 in.  
Wheelbase ..... 10.83 in.  
Width (F/R) ..... 9.21 in.

**WEIGHT (gross, RTR)** ..... 3 lb.

**CHASSIS**  
Type ..... Dual rail  
Material ..... Molded

**DRIVE TRAIN**  
Type ..... Gear  
Transmission ..... Gear  
Differential(s) ..... Solid steel  
Slipper clutch ..... None  
Bearings/bushings ..... Bushings

**SUSPENSION**  
Front ..... Coil spring  
Rear ..... None  
Damping ..... Friction

**WHEELS (F/R)**  
Type ..... 3-spoke  
Dimensions (DxW)  
—Front ..... 2.2x1 in.  
—Rear ..... 2.2x1.3 in.

**TIRES (F/R)** ..... RT3 on-road  
**LIST PRICE** ..... \$139.50



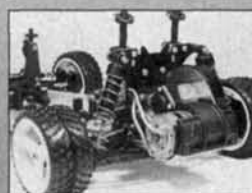
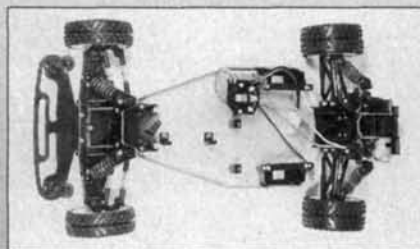
LIKE



DISLIKE



LIKE



**DIMENSIONS**  
Length (overall) ..... 18 in.  
Wheelbase ..... 10.75 in.  
Front width ..... 9.17 in.  
Rear width ..... 9.69 in.

**WEIGHT (gross, RTR)** ..... 3 lb., 4 oz.

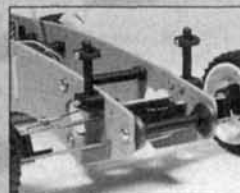
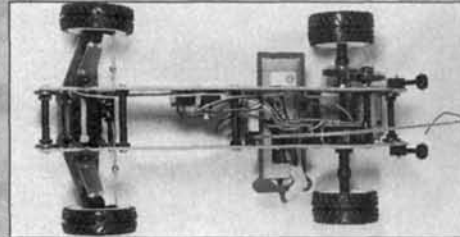
**CHASSIS**  
Type ..... Tub  
Material ..... Alloy

**DRIVE TRAIN**  
Type ..... Belt  
Transmission ..... Belt  
Differential(s) ..... Ball  
Slipper clutch ..... Optional  
Bearings/bushings ..... Bushings

**SUSPENSION (F/R)**  
Type ..... Independent wishbone  
Damping ..... four oil-filled shocks

**WHEELS (F/R)**  
Type ..... 3-spoke  
Dimensions (DxW)  
—Front ..... 2.2x1 in.  
—Rear ..... 2.2x1.3 in.

**TIRES (F/R)** ..... RT3 on-road  
**LIST PRICE** ..... \$179.50







# Paint and Detail Sedan Bodies

by MIKE OGLE

**T**HE EURO-SEDAN parking-lot racing phenomenon might be the biggest thing to hit the R/C scene since Ni-Cds. Out here on the Left Coast, on any given Sunday, you'll find a swarm of these little wonders bangin' bumpers in a shopping-mall parking lot—anywhere from San Francisco to San Diego. They've got the right stuff—the easy maintenance, the good handling and a high degree of realism—to grab the interest of a wide range of hobbyists (from speed-seeking, hard-core racers to magnifying-glass-wielding concours fanatics).

In fact, most of the sedan kits on the market are so realistic right out of the box that most people don't do anything but spray the body one color and apply the kit's decals. Unfortunately, when they show up at the track, there are four or five other cars virtually identical to theirs—in their heat! The resulting

scene sounds something like this: "There's a small pileup in turn 1, but the red Alfa has broken away and is making its way down the back straight toward the sweeper. But, wait a minute, (*karunch!*) it has just plowed full-speed into the outside wall; and now there's some idiot in another red Alfa repeatedly center-punching the guardrail (*whomp, whomp, whomp*) half-way down the back straight! And...owww! He just got broadsided by another red Alfa!"

Yeah, you don't have to be a genius to figure out who is mistakenly watching someone else's car here! It happens! So avoid the embarrassment by distinguishing your sedan from the rest of the pack. With just a little extra effort, you can have a concours-winning standout! Here are a few detailing tips—from mild to wild—to make your parking-lot racer something really special!

**1** Tamiya's Alfa Romeo features a ground-effects front end that's full of air intake vents. After you've painted these areas



black, cut out some small pieces of fiberglass screen, and glue them to the vents. For these areas, Tamiya includes stickers that you can use to get the exact shape you need for the screen pieces.



**4** Using an underbody antenna kit will rid your car of an unsightly less-than-scale R/C antenna. To simulate the small racing radio antennas used by drivers to talk to their pit crews, use a flexible, single bristle

from a plastic hairbrush. Another handy little item to have (or borrow) is an electronic labeling device, such as the Brother P-Touch. Custom lettering is easily produced in a variety of colors and styles, like the white "Sport System" markings and the driver's name in the rear window.

**Topping**



**2** For an interesting look, try a piece of prismatic tape in place of the headlight stickers. When you race out in the sunlight, the flashy tape simulates highly reflective headlight lenses.

**3** Detail the side mirrors by trimming a small piece of chrome MonoKote\* to fit the lens pieces. To simulate brake dust and road grime around the trailing edges of the front wheel well, airbrush in a light fogging of thinned-down black paint.



PHOTOS BY MIKE OGLE





**5** HPI's\* 7-spoke chrome wheels shod with Pro-Line's\* new Sedan Hawg tires are detailed in one of the hottest styling trends of the real automotive world: accents in the wheels are done in the same colors as the body.



**6** The interior and the scale-driver figure are molded out of a white ABS-type plastic that is best painted with

Testors\* Detail Master flat-finish paints for plastic models. White fingernail polish is used to achieve the high-gloss pearlescent finish of the driver's helmet. To add the small details to the driver's suit, I used red and blue Sharpie permanent markers.

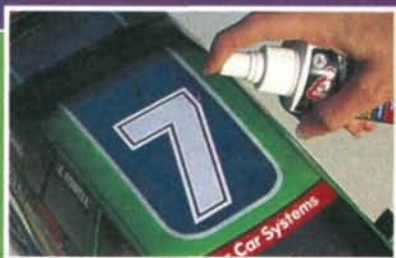


**7** To simulate the rear exhaust pipes, Tamiya includes decals in their kits; but I opted to make a set out of some flexible silicone fuel tubing that I had dyed black. Why flexible tubing?

Anything rigid might get knocked off by tailgating traffic; this stuff looks good and absorbs the inevitable bumps of racing. A little exhaust grime has been air-brushed onto the rear bumper just above the exhaust tips.



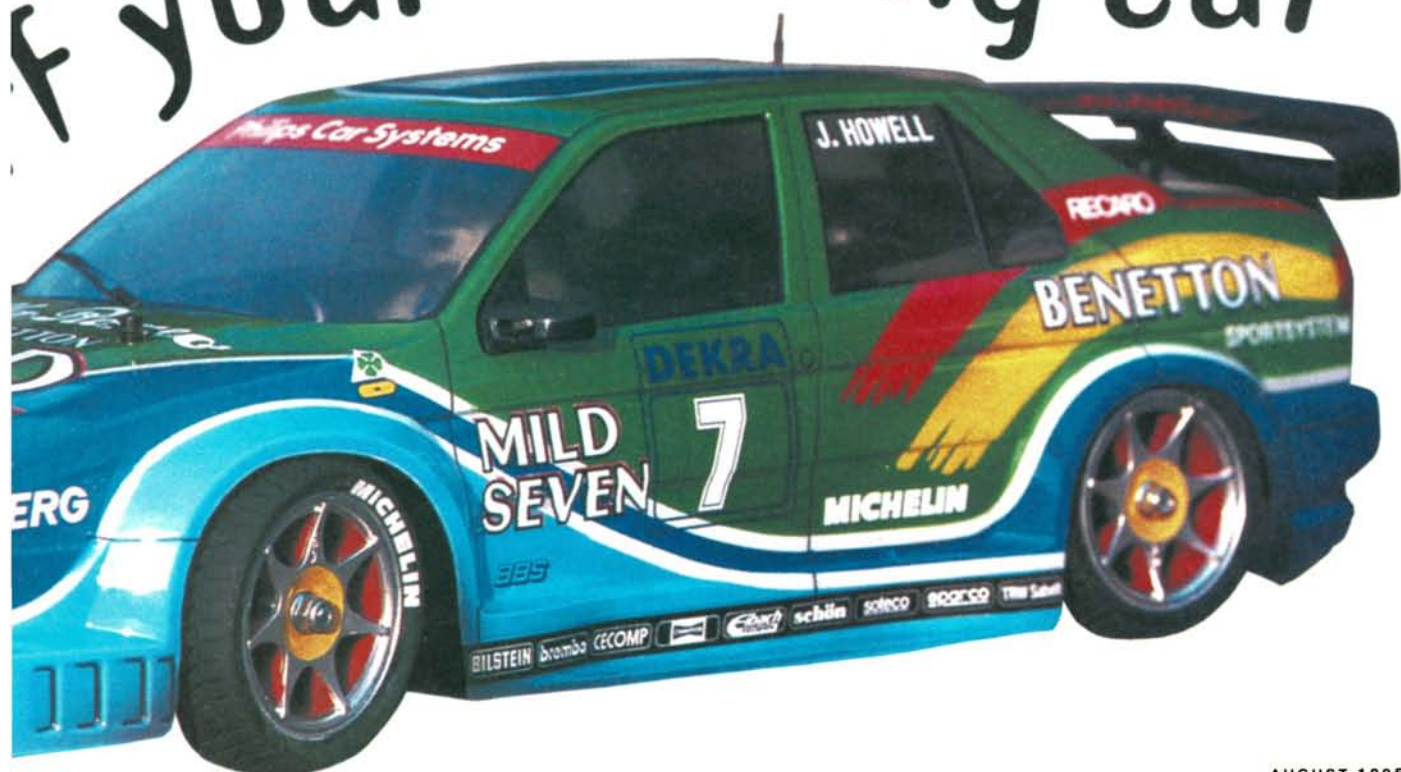
**8**



For anyone who wants to tackle a detailing job that has a lot of decals, Autographics\* recently introduced a must-have product—Sticker-On decal-application fluid. Just spray it onto the body before you apply the stickers, and you'll be able to slide them into position and burnish out all those annoying little air bubbles before the sticker's adhesive has taken hold permanently. This stuff really works!

\*Addresses are listed alphabetically in the Index of Manufacturers on page 200.

# f your touring car





BENNETT EQUIPMENT'S

# CLOD-A-LEA



# MAXIMUM



# VER II

The cantilever-type shock system is similar to that used on full-size monster trucks.

by Joe Leffelman

**T**HE ORIGINAL Clod-A-Leaver suspension kit was a winner in its own right. Joe Kirkwood, who used this chassis to win several world and national titles, made it even better. In 1989, he began work on a new kit and with the help of Del Flagg, by 1992, it was ready for production. The new Clod-A-Leaver II chassis for the Clod Buster is now manufactured by Larry Bennett of Bennett Equipment\*.

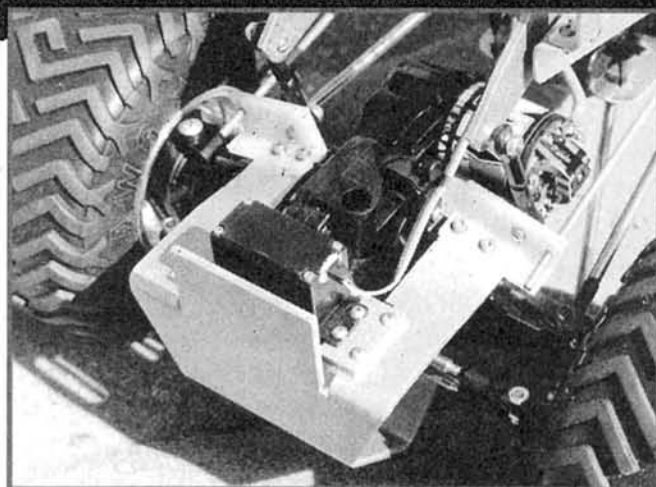
## THE KIT

Made of aluminum and stainless steel, the chassis alone weighs 8.5 ounces. Four cross-members and a bottom brace connect the two sides. The radio tray, which is mounted in the middle of the chassis, is easy to reach. The sway bars are mounted on the chassis with screws that go through the sides. In the original chassis, the sway bars were attached to the bottom brace with cumbersome nylon blocks. In the new version, the sway bars are higher, and the battery box is where the sway bars used to be. Putting heavy items in the lowest point of the chassis helps to stabilize the big trucks when they make a turn.

The stainless-steel ladder bars are mounted on the chassis with Rocket City\* ends. There's a spacer nut where the bottom four ends are attached to the chassis. This prevents the chassis from bottoming out and provides additional suspension travel. To attach the bottom bars to the bottom of the axle, drill an  $\frac{1}{8}$ -inch hole, and install the bottom bar with the provided 4-40 nut and bolt. The upper bars use the existing hole at the top of the axle, and then the rear of the ladder bar fastens to the sides of the bottom brace. These bars, which are longer than the stock ladder bars, extend the wheelbase to an impressive  $13\frac{3}{4}$  inches, and this means a more stable truck that handles better.

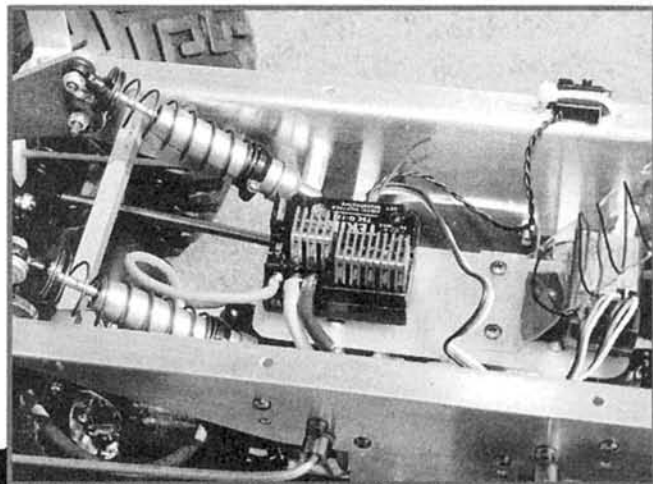
The cantilever-type shock system is similar to that used on full-size monster trucks. They're angled toward the middle of the chassis on the inside of the side plates. The shocks angle upward toward the end of the chassis and are attached to the cantilever arm. On the other end of the arm is a rod that's attached to a nylon bracket that's mounted on the stock axle brace.

The steering for this monster is controlled by a servo that's mounted



**Top: the front servo mount/brush guard is one beefy unit. During our testing session, we pounded the truck over some pretty hefty 1/10-scale boulders, and it walked away without a scratch.**

**Bottom: the cantilever shock system is mounted inside the chassis. With this setup, you don't need the hi-zoot, high-price, hard-anodized shocks. Any decent aluminum-body, oil-filled shocks will do.**



PHOTOS BY JOHN HOWELL

# MONSTER



# Modifieds

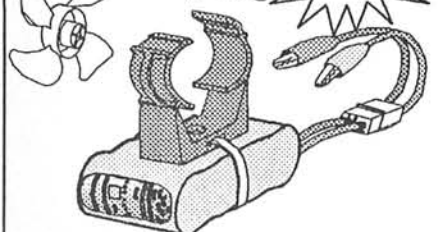
Race Prep has been building Modified Racing Motors for 12 years and building a racing record with State and National Championships. The high quality of our Stock Motors was generated directly from our Modified Motor expertise. If you've seen how fast Powerzone Stock Motors are, just imagine! "E" Mod Motors

Built from State of the Art components, Handwound, Epoxied, Welded, Balanced, Diamond Trued, Precision Shimmed, & Dyno Tuned. Custom winds available.

#RP-905-102	Ten turn big wire double.	\$85.00
#RP-905-122	Twelve turn big wire double.	\$85.00
#RP-905-143	Fourteen turn triple.	\$85.00
#RP-905-163	Sixteen turn triple.	\$85.00

All motors include the Dyno sheet and a FREE Motor Tube.

## Power Break-in Kit

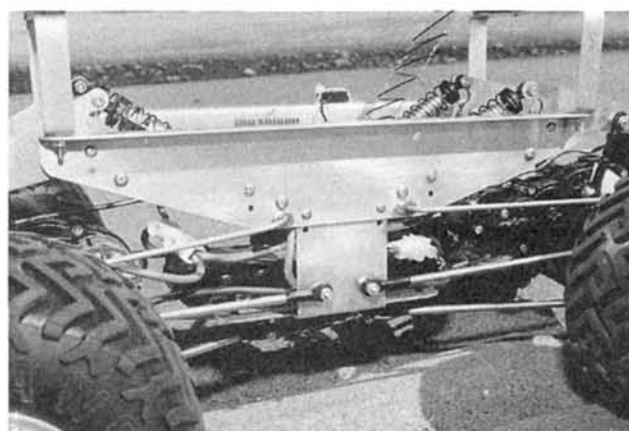


Complete kit for breaking-in a motor. The battery pack powers the motor at low voltage while the fan cools the motor and also adds a load to the motor for more efficient break-in periods. Makes a great work station for soldering brushes. Do you have four extra cells? Get the Power Break-in Kit without batteries.

#RP-54	Power Break-in Kit	\$32.95
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#RP-56	Motor Break-in Fan	\$3.95

**Race Prep Racing Motors**  
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Send \$2.00 for catalog

## CLOD-A-LEAVER



The stainless-steel suspension links are pretty hefty. The front and rear sway bars help keep the truck from swappin' all over the place.

on the gearbox with a heavy-duty aluminum bracket. This bracket protects the servo and is attached to the axle braces. With the servo mounted on the gearbox, there is no bump-steer—a problem with which all Clod owners can identify. The bracket can handle a 1/10- to 1/4-scale servo, and a 4W steering option is available by using a second servo in the rear.

Before I completed the assembly, I decided to make a few changes. I've been to the NR/CTPA Worlds often enough to know what works and what doesn't. First, you don't need expensive shocks to make this chassis work well. Any decent set of oil shocks will do the job.

### TIME TO TEST

Having made these changes, I was ready to let my Clod rip. I had seen the Clod-A-Leaver II in action before, but now I got to test it on my own. To the school parking lot I went with my Clod in one hand and a couple of ramps in the other. I started out



The amount of suspension travel you get with the Bennett Clod-A-Leaver II truck kit is immense! Notice that all three tires remain planted on the ground while this one wheel is lifted all the way up.

by just doing simple figure-8s so that I could view the steering response up close and see how the truck acted during mild turning. As expected, it wasn't long before mild turned into wild! Steering at high speeds was no problem at all. The sway bars worked flawlessly. Even when tackling the rough ground, the steering stayed true to form—no bump-steer here.

It was time to check out the suspension, so I lined up the ramps about 5 feet apart. After a couple of runs, I noticed that the Clod was landing too hard, so I put some lighter oil in the shocks (30WT is recommended). That slight change made all the difference. I became so confident when I hit the jumps and landed that I had to move the ramps farther apart because I was hitting one and landing on the other.

Then I put one ramp on top of the other and let the Clod launch. It soaked up the landing nicely. With the bottom of the chassis open, the gear cases actually rise into the chassis when the car lands. Even with the suspension rods shortened, I had in excess of 2 1/2 inches of suspension travel.

### FINAL WORD

I really like this Clod-A-Leaver II kit. It is more complete than before with the chassis, sway bars, cantilever shock system and ladders bars but no bump-steer; what more could you ask for! With a little effort, the chassis can be polished to an almost chrome-like finish.

I'm sure I'll see more of these at the Worlds this year, and I just might be able to compete with the big boys. Anyway, if you're into monster truck racing or just backyard bashing, take a look at the Bennett Clod-A-Leaver II. I think you'll like what you see. Until then, keep those big wheels rollin'.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 200.





# CAR OF THE YEAR

by George Gonzalez

**T**HE TEAM LOSI® Double-X made its debut at the '93 IFMAR Off-Road World Championships. In the hands of Team Losi factory driver Joel Johnson, it set the pace by taking the "top qualifier" honors in the 2WD class. Since then, the Double-X has won so many regional and national championships that it would take pages to list them all!

The Double-X represents the cutting edge of R/C 1/10-scale off-road racing technology, and it's the result of extensive research and development using the latest in computer-assisted design (CAD) and computer-assisted manufacturing (CAM). The materials used to make it are of the highest quality, and all have been subjected to Losi's unique "finite element analysis" (stress analysis). The parts are molded to meet such high standards that they look machined. It's hard to believe that Team Losi's molding techniques could be improved on.

The Double-X was designed with the future in mind, and there's no doubt this is the car to take us there. It isn't any wonder that the *Car Action* staff chose it as their 1995 Car of the Year. Let's take a closer look at this remarkable car.



## The Losi Legion:

This year, in the capable hands of Team Losi drivers the Double-X has won almost every major race in the country. Here are some drivers who've had great success with the Double-X. Left to right: Brian Kinwald, Jay Robinette, Joel Johnson, Matt Lee, Jeffrey Kinoo, Jimmy Babcock, Greg Hodapp, Kevin Moore, Todd Lewis.

## Choice Ch



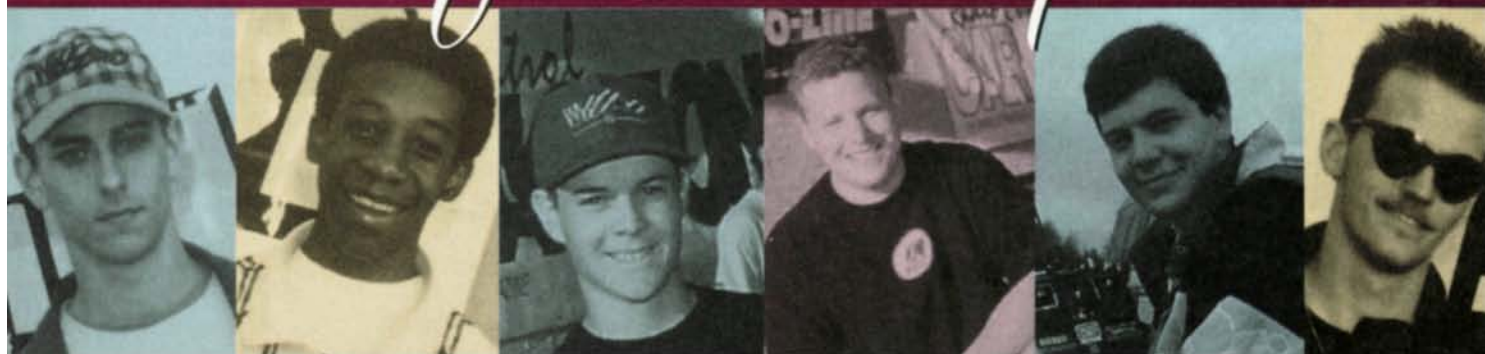




# TEAM LOSI DOUBLE-X

PHOTOS BY GEORGE GONZALEZ

*ariot of Champions*



## CAR OF THE YEAR

### WINNING FOUNDATION

The Double-X was designed around the low-center-of-gravity (CG) Losi G tunnel chassis, which is molded out of their special "Stiffezell" composite. The chassis is extremely light and tough—perfect for off-road racing. It's also extremely rigid, so there's no flexing, and the suspension can do its job effectively.

**The Double-X has won just about every national championship around the world, and it's sure to win many more.**

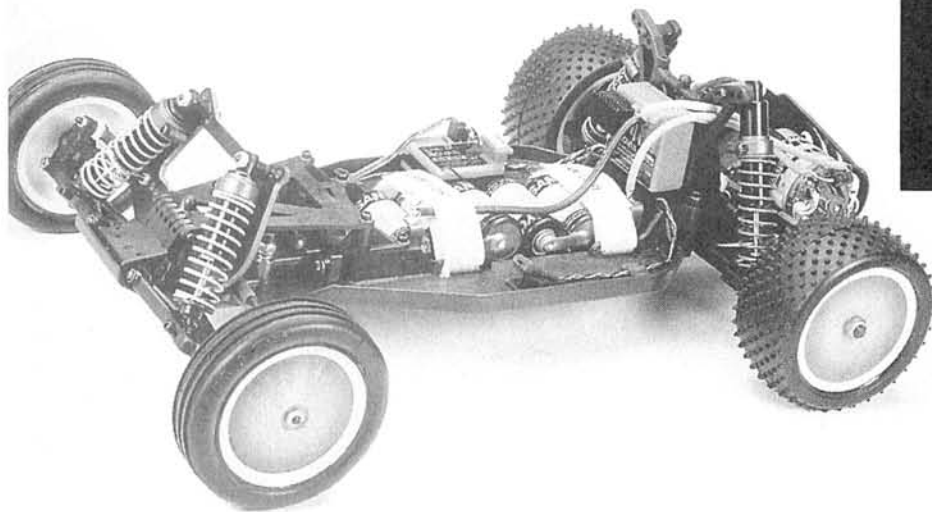
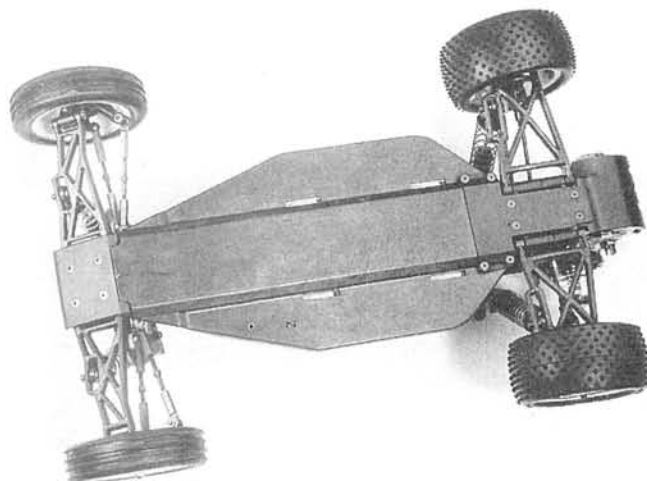
The low-CG design allows the battery pack to rest lower in the chassis, and the result is improved handling and fewer roll-overs. The raised sides give extra ground clearance during hard cornering and

through rough terrain. The battery compartment runs along the center of the chassis and, using the supplied foam battery spacer, the battery may be positioned toward the front (for more steering) or farther back (for increased rear traction).

### PASSING GEOMETRY

The Double-X's super-trick, steering bellcrank system has a built-in servo-saver and feels silky smooth—yet tight. The system is designed to mate with the Double-X's front suspension and provides excellent geometry. By tightening or loosening a tension nut on one of the steering posts, you can adjust the servo-saver to obtain the amount of steering torque you want. And you can adjust Ackerman by lengthening or shortening the center drag link.

*Right: as you can see from this underbelly shot, the Double-X's G-tunnel chassis features a low-CG design. The raised sides help with ground clearance during hard cornering.*



## SPECIFICATIONS TEAM LOSI-DOUBLE-X

SCALE ..... 1/10  
LIST PRICE ..... \$339.95

### DIMENSIONS

Overall length ..... 15 in.  
Wheelbase ..... 10.625 in.  
Front width ..... 9.625 in.  
Rear width ..... 9.875 in.

WEIGHT (gross, w/battery) ..... 3 lb., 8.5 oz.

### CHASSIS

Type ..... Three-piece modular  
Material ..... Molded composite

### DRIVE TRAIN

Type ..... Sealed gear drive (2.19:1 reduction)  
Primary ..... Pinion/spur  
Transmission ..... Gear  
Differential(s) ..... Racing ball diff  
Slipper clutch ..... Friction w/Hydra Drive  
Bearings/bushings ..... Sealed ball bearings

### SUSPENSION

Type ..... Independent A-arm w/adjustable  
camber link  
Damping ..... Oil-filled, coil-over shocks

### WHEELS

Front type ..... Double-X offset w/dirt shield  
Dimensions (DxW) ..... 2.1x0.75 in.  
Rear type ..... 2.2-caliber w/dirt shield  
Dimensions (DxW) ..... 2.2x1.625 in.

### TIRES

Front ..... A-7201 HT ribbed  
Rear ..... A-7364 HT IFMAR stud

### ELECTRICS

Motor, battery, ESC ..... Not included

### MODULAR WHAT?

To really appreciate the Double-X's modular design, you have to experience it firsthand. By taking out a few screws, you can remove the entire rear end (suspension intact), or just the transmission. The front end features a hinged front bulkhead that allows you to swing the suspension out of the way for quick and easy access to the servo and the steering linkage. Without a doubt, Double-X is extremely easy to work on and maintain.



### ALWAYS WANTED A HARD BODY?

The Double-X's extra-long suspension arms are molded out of Stiffezell, and they give the buggy a wide stance that makes the car stable in the rough sections. At the back, the buggy's pivot support gives the arms 4 degrees of anti-squat, and the rear hub carriers provide 3½ degrees of toe-in. Optional rear pivot supports and rear hub carriers are available in various degrees of anti-squat and toe-in.

Losi's Hard Body, hard-anodized shocks (included) are among the best in the business, and they provide super-smooth operation without leaking. The kit includes a set of green springs (3.5 rate) for the front and a set of red springs (2.6 rate) for the rear. The kit also includes a set of no. 56 Teflon™ shock pistons for the front and rear shocks and Silatech 350 (30WT) shock fluid.

### LIQUID TRACTION CONTROL?

The Double-X is equipped with a racing-style three-gear tranny that has an externally adjustable ball differential. The tranny case features a laydown configuration that lowers the CG. With its carbide balls and polished rings, the diff is as smooth as can be, and it's easy to adjust; just insert the tip of an Allen wrench into the left out-drive and then rotate the right wheel—clockwise to tighten and counter-clockwise to loosen.

The tranny also includes a slipper clutch with a conventional thrust bearing and the legendary Hydra Drive traction-control unit. The Hydra Drive allows the slipper clutch to be set extremely loose; this reduces friction and allows the Hydra Drive fluid to do the rest. Volumes could be written about the advantages of this unit; it really works.

The tranny has trick universal dogbones and an 88-tooth, 48-pitch spur gear. Its super-low 2.19:1 final gear ratio is suitable for stock and modified motors, and the instruction manual makes finding the right gear ratio a snap.

### OTHER HOT FEATURES

The Double-X has a set of hot-looking disk-type front and rear wheels with Lexan dirt shields. Owing to the front wheels' offset, the bearings are installed in the front steering arms instead of in the front wheels; this keeps the bearings away from the elements, and that cuts down on maintenance and positions the kingpins in the center of the front wheels for improved steering. The rear wheels are also deeply offset, so the rear axle carriers may be

*Right, top to bottom: engineered for performance and easy maintenance. Losi designed the Double-X's front suspension to "swing" out of the way to allow easy access to the steering mechanism and the shock tower's camber locations.*

*The Double-X's front-wheel bearings are placed in the steering hubs. This was done to allow the steering pivot point to be placed dead center in the wheel for better steering response.*

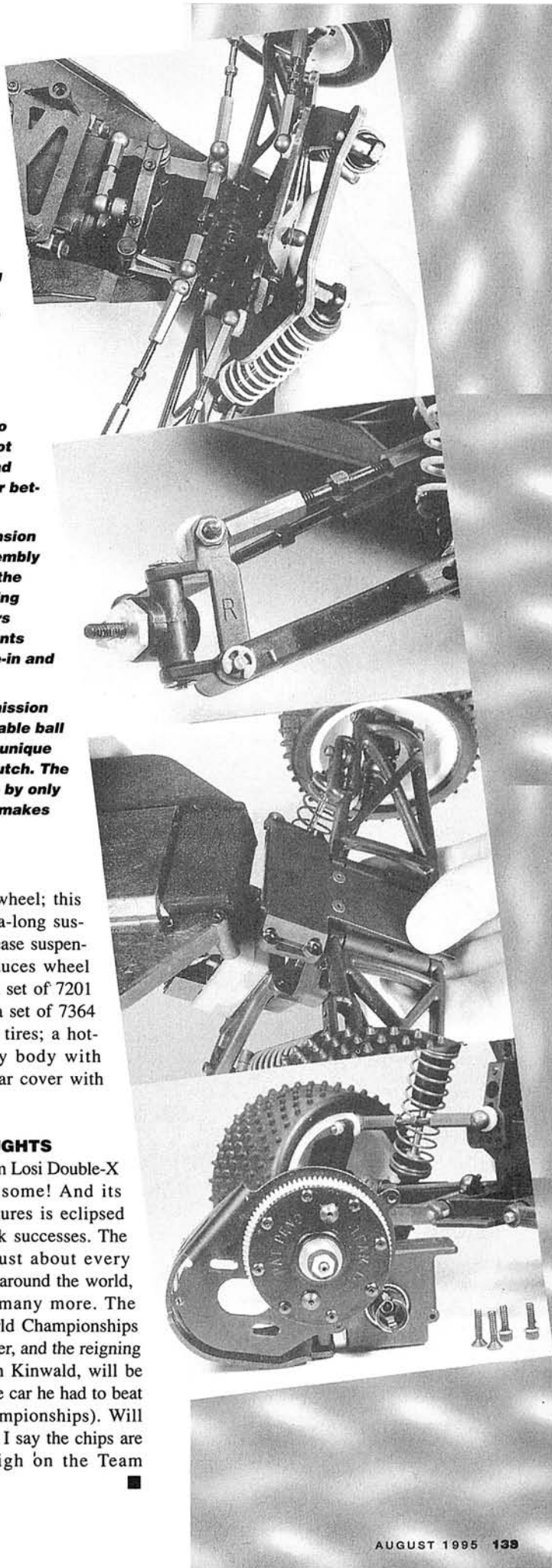
*The entire rear suspension and transmission assembly can be removed from the main chassis by undoing four screws. Losi offers optional rear arm mounts that have different toe-in and anti-squat angles.*

*The Double-X's transmission features a fully adjustable ball differential and Losi's unique Hydra Drive slipper clutch. The tranny is held in place by only four screws, and that makes maintenance a snap.*

mounted deep in the wheel; this allows the use of extra-long suspension arms that increase suspension travel, and it reduces wheel scrub. Also included: a set of 7201 HT ribbed front tires; a set of 7364 HT IFMAR Stud rear tires; a hot-looking Lexan buggy body with wing; and a Lexan gear cover with slipper-access hatch.

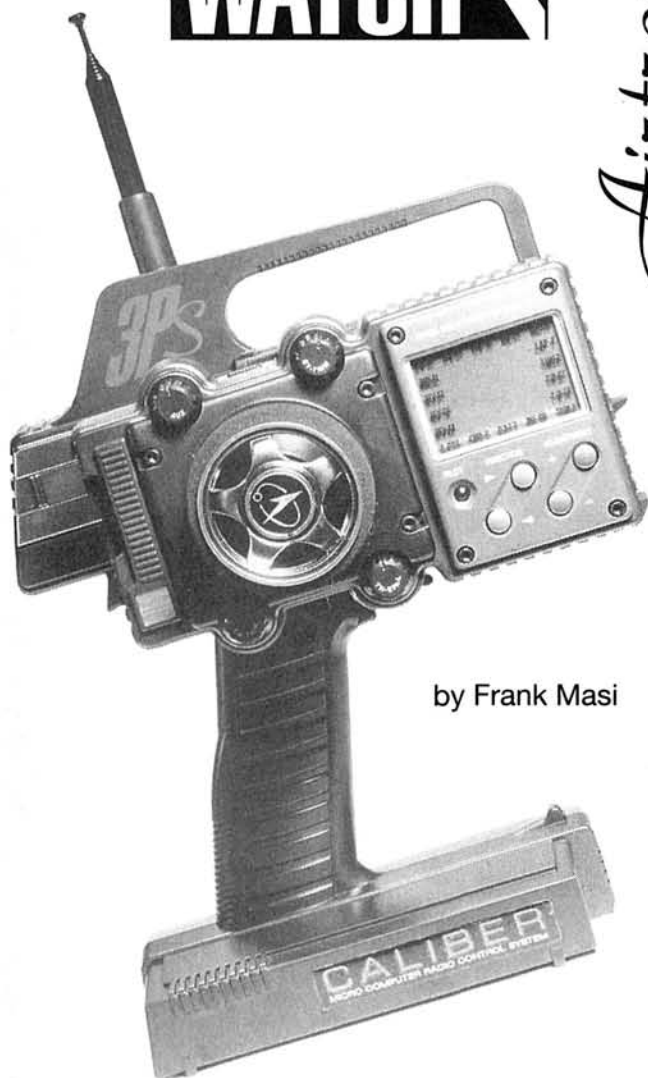
### FINAL THOUGHTS

As you can see, the Team Losi Double-X has it all—and then some! And its impressive list of features is eclipsed only by its list of track successes. The Double-X has won just about every national championship around the world, and it's sure to win many more. The IFMAR Off-Road World Championships is right around the corner, and the reigning world champion, Brian Kinwald, will be driving a Double-X (the car he had to beat at the last World Championships). Will Brian pull it off again? I say the chips are stacked up pretty high on the Team Losi table. ■



**NEW  
PRODUCT  
WATCH**

*Airtronics*



by Frank Masi

# Caliber 3Ps

## Improving a top gun

**W**ITH THE INTRODUCTION of the Caliber 3P several years back, Airtronics\* brought to the R/C car market its first computer-controlled system. By using a tiny microcomputer, the Caliber offered state-of-the-art trim settings and multi-model memory—features that had previously been available only on sophisticated model aircraft radios.

For 1995, Airtronics decided it was time to update its top-line surface-use (car and boat) radio, but can a radio as capable as the Caliber be improved? Read on for the answer.

### CALIBER 3Ps—A LIVE ROUND

The new Caliber, called the 3Ps, shares the same basic outer shell as its predecessor, but much of its insides are new and improved. The 3Ps retains the innovative features that made its ancestor famous: memory for up to three models' trim settings, reversible grip for left-hand operation (an Airtronics' exclusive), a built-in timer function and an auxiliary, proportional third channel. The biggest difference between the 3P and 3Ps, however, is the speed at which the new radio's computer does its thing—about four times faster than the old radio!

### A FASTER RADIO?

The most interesting new feature of the 3Ps is its response control switch (RCS). Located on the radio's case just below the steering wheel, this three-position switch allows you to adjust the speed of the radio's response to steering and throttle input by adding to or subtracting from the settings of the transmitter's adjustable rate control (ARC) function. For more information on ARC and what it does, see "Trim Functions."

When the switch is set in the "N" (normal) position, steering and throttle rates will be 0 percent, or proportional to steering wheel or trigger movement. This is probably the setting that most users will choose. Flick the switch to the "M" (mild) position, and response becomes 8 percent slower. This setting is good for beginners and those who prefer a slight delay between control input and model response. Expert drivers and those with lightning-fast reflexes will appreciate the "Q" (quick) setting. Response in this mode is quickened by 5 percent. Control is instantaneous and requires total concentration from the driver. No blinking!

The steering- and throttle-response rates can be adjusted separately by using the ARC function. In this case, the response-control switch adds its preset values (5 per-

**Above:** Airtronics' new 3Ps is an upgraded, 3-channel FM system. The good ergonomics and wealth of features of its predecessor—the 3P—remain intact. **Left:** a plug-in RF module allows you to change from 27MHz to 75MHz.



PHOTOS BY WALTER SIDAS



cent for quick, 0 percent for normal or -8 percent for mild) to whatever response-rate values you've selected using the ARC.

### UPDATED INTERFACE

As with the 3P, the many functions and settings of the 3Ps are accessed through a scrolling LCD screen and keypad on the radio's face. Airtronics has refined these user-interface controls slightly by trimming the old Caliber's six buttons to only four on the 3Ps and by printing the function menu on the lens of the LCD screen. On the 3P, the function menu was part of the LCD display, and battery power was consumed unnecessarily.

As before, you use the left- and right-arrow buttons on the keypad to highlight one of the functions listed on the LCD screen. Plus and minus buttons are used to change the numerical setting of each trim adjustment and to switch the other functions on and off.

### FORGET ME NOT!

The old Caliber had a "one-time" memory feature that would "forget" your changes when the transmitter was switched off. I bought my Caliber 3P about a year after its introduction and was often frustrated by this feature. Here's what would happen: I would make trim changes using the trim dials (there are four trim dials near the Caliber's steering wheel). Then I would use the TRM-M (trim memory) function to store these settings so that the dials could be re-centered. On switching the transmitter back on, I often found that the settings were back to where they had been before I saved them. To re-center the trim dial so that its full range of trim could be used, I had to adjust the model's mechanical linkage or ESC settings.

Airtronics has successfully addressed

this problem on the new Caliber. The first thing I tested after installing the 3Ps system in an off-road buggy was the radio's new one-touch trim memory. To use this feature, simply scroll to TRIM-R (trim reset) on the screen, adjust the steering- or throttle-trim dial to where you want it, then press the "plus" button on the keypad. Switch the transmitter off (turn the model off first, of course), re-center the dial to the neutral position, and turn the transmitter back on. Presto! The 3Ps performed flawlessly time and again during my test.

### ADDITIONAL FEATURES

In addition to providing enough trim functions to satisfy the pickiest of racers (see "Trim Functions"), the 3Ps offers several unique features that set it apart from many of its competitors.

- **Starting position switch (S-POS).** This works like a dual-rate switch for the throttle. Turning on the S-POS advances the throttle slightly to raise the idle of a glow- or gas-powered engine. This switch is beneath the sliding cover that's above the handgrip.
- **Key lock.** When turned on, this feature prohibits any data changes or elimination. Part of the LCD display on the old Caliber, it's now a manual slider switch on the transmitter's case behind the display and the keypad.
- **Stopwatch/timer.** This feature doesn't actually time your laps; rather, you preset a specific lap time into the computer, then hit the timer button that's above the steering wheel to start the clock. You'll hear a beep



Compare the old Caliber 3P (left) with the 3Ps. Note the differences in the display area and the keypad.

each time the timer counts your preset lap time. An actual stopwatch would be more useful, though.

The 3Ps can also be used as a countdown timer—particularly useful for determining fuel stops when you run engine-powered vehicles. When the clock ticks down to zero, it starts to count. It also works as an up-timer if you don't set a specific time.

- **Display switch.** You can access and change information on the radio's LCD without transmitting a radio signal. The switch shares the space under the sliding cover with the S-POS switch.
- **Direct servo control.** You can control your model without transmitting a signal. Connect one end of the included cable to the transmitter and the other to your receiver's battery channel (for electric-powered

### HITS

- Faster, more efficient processor; less current drain.
- Improved trim memory.
- User-friendly and ergonomic design.
- Plug-in RF module enables use in both 27MHz and 75MHz.

### MISSES

- Stopwatch function could be made more useful.

## Trim Functions

- **Servo-reversing.** You can reverse the direction of travel of the steering, throttle and auxiliary channels.
- **Steering dual-rate (D/R).** The trim dial next to the throttle trigger controls the steering servo dual-rate, i.e., the servo's maximum and minimum travel. Use the dual-rate (D/R-ST) function on the LCD to set the amount of change controlled by the trim dial.
- **Endpoint adjustment (EPA).** This function sets the limits of throw (movement) of the steering servo's left and right travel (independently), and it sets the throttle channel's high point and brake point. This indispensable feature eliminates the servo "humming" that occurs when the servo fights against the mechanical limits of its linkage.
- **Adjustable rate control (ARC).** You can set the response rate (speed) of the steering and throttle channels from a linear (pro-

portional to wheel or trigger movement) response to a quicker or slower response. Adjusting the steering (ARC-ST) affects both left- and right-turning abilities. Adjusting the throttle (ARC-TH) affects only the forward throttle, not the brake.

- **Throttle EPA-L.** The lower, right-hand knob on the transmitter's face controls the endpoint adjustment (EPA) of the brake function. This feature is especially useful for fine-tuning braking during a race.

- **Trim rate (T/R).** This feature controls the trim travel (range) for the steering- and throttle-trim knobs.

- **Trim reset (TRIM-R).** This feature functions similarly to a sub-trim. You can save settings for the steering- and throttle-trim knobs so that the knobs can be re-centered for maximum trim throw in each direction.

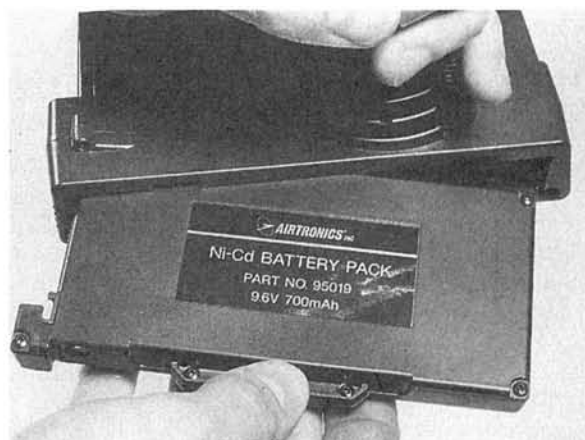
cars) or to the on-board battery's charging connector (for engine-powered cars). It's useful for setting linkages and trims at a race in which strict frequency control is in effect.

- **Command signal on/off switch (CMD-S).** Kudos to Airtronics. You can turn off the beeping that occurs with each touch of a keypad button.

- **Wheel tension.** You can alter the steering-wheel tension, but you'll have to

remove the wheel section from the transmitter.

- **Alarm-volume adjustment.** The volume of the low-battery warning alarm can be lowered. Some racers actually like the alarm to sound on the drivers' stand, because it breaks the concentration of other racers! Hint: not the most considerate tactic.



**Optional Ni-Cd TX pack slides neatly into the radio's base. A convenient charging jack is provided on the battery-compartment cover.**



**The "main office" of the 3Ps shows the steering wheel, trim knobs and keypad/LCD display area. Airtronics has simplified the 3Ps controls for easier programming.**

## USING THE NEW CALIBER

The Caliber 3Ps has a neutral, balanced feel in the hand (even with antenna extended), and you can further tailor it to fit by adding one or both of the included rubber extension pads. For larger hands, Airtronics sells a two-piece rubber grip pad that completely envelops the transmitter's grip area. The driving "feel" of the radio is very good, though, ergonomically, I think that the

Airtronics XL2P and CS2P have a slight edge in the wheel-to-trigger alignment category.

Overall, the 3Ps is a successful upgrade of a proven design. In fixing the trim-save "glitch" and simplifying some of the main controls and functions, Airtronics has taken away my one gripe about the Caliber and has come out with a truly top-of-the-line radio system.

*\*Addresses are listed alphabetically in the Index of Manufacturers on page 200.*

# MODEL IMPROVEMENT

WITH RON AILER AND HOBBY BOBBY

INTRODUCING ROBERT'S NEW SNAKE OIL SP-10 COMPLETE LUBRICATION SYSTEM

GEE BOBBY, YOU SURE HAVE BEEN BLOWIN' MY DOORS OFF LATELY! WHAT'S YOUR SECRET?

OH, I DON'T KNOW, 'JUST LUCKY I GUESSES.

LUCKY? IT'S MORE THAN THAT! YOUR R/C CAR, BOAT AND PLANE ARE ALL FASTER THAN MINE NOW. YOU'RE DOING SOMETHING DIFFERENT.

SSSSSOME-THING DIFFERENT?

YEAH! I'VE NOTICED YOUR ENGINE IS RUNNING SMOOTHER TOO! DID YOU GET A NEW ONE, OR ARE YOU ON SOME NEW KINDA FUEL?

NO, SSSSSAME OL' ENGINE, SSSSSAME GASSSSSSS.

SO, COME ON PAL, WHEN YOU GONNA TELL ME YOUR SECRET?

SSSSSSOMEDAY, MAYBE.

SNAKE OIL LUBRICANTS ARE THE RACERS' SSSSECRET WEAPON!



**POWERREV**  
TURNING ENGINE RED LINES GREEN  
WITH SP-10

SNAKE OIL LUBRICANTS' POWER REV R/C ENGINE TREATMENT (SP-01) CONTAINING THE SUPER LUBRICATING FRICTION PROTECTION FORMULA SP-10, MAKES ENGINES RUN COOLER, FASTER AND SMOOTHER WITH LESS MAINTENANCE. POWER REV FUEL TREATMENT (SP-02) OXYGENATES, CONDITIONS AND STABILIZES GAS OR GLO FUEL TO MAKE IT OUTPUT HIGHER RPM'S, IMPROVE STARTING, IDLE AND HIGH SPEED OPERATION WHILE IT ALSO CLEANS AND LUBRICATES THE ENTIRE FUEL SYSTEM. AND TO ADD THE FRICTIONAL HEAT AND WEAR PROTECTION OF SNAKE OIL TO YOUR GASOLINE FUELED VEHICLES, POWER REV IS AVAILABLE AS R/C 2-CYCLE OIL (SP-06). WHY NOT TRY THE SSSSECRET WEAPON IN YOUR R/C CAR, BOAT OR PLANE TODAY!



Power Rev is part of Robert's Snake Oil SP-10 Complete Lubrication System. To find out more about Power Rev R/C Engine Treatment and Power Glide R/C High Performance Lubricants, send us a self-addressed, stamped, business-size envelope.



Robert Manufacturing, Inc.

P.O. Box 1247, St. Charles, Illinois 60174 708-584-7616

SNAKE OIL T-SHIRTS ARE NOW AVAILABLE FOR A LIMITED TIME. SEND \$12.50 EACH PLUS \$2.50 SHIPPING & HANDLING AND PLEASE SPECIFY SIZE: LARGE OR EXTRA-LARGE AND ALLOW 4-6 WEEKS FOR DELIVERY.



# HOW TO

# Battery Charging/Discharging

BY STAN VAN DRUFF



A trio of inexpensive chargers. The little Cox in the center can charge 6-cell, 1200mAh battery packs from a car's cigarette lighter. The Pro-Tech on the left and the MRC unit on the right can charge or discharge 6- and 7-cell packs at up to 5 amps.

HAVING THE RIGHT BATTERY charger can mean the difference between winning a race and settling for second. For those who don't care about the A-Main, the right battery charger can mean the difference between keeping batteries for years and having to buy new ones every season. Hobby shops and catalogues carry a bewildering array of chargers, and it's hard to know which is best.

To get the most out of your Ni-Cds, you want a charger that meets your needs.

## CELL THERAPY

Chargers come in an amazing variety: trickle, linear, constant-current, pulse, peak and reflex. In addition, you can choose from among alternating current (AC), direct current (DC) and combination models. Some are strictly for 6- or 7-cell R/C batteries, while others can charge any Ni-Cd you have. Some even have settings for batteries other

than Ni-Cds (such as nickel-hydride cells).

### TO EACH HIS OWN

Every type of charger fills a different need. Your budget may suggest you buy the cheapest charger you can get, while your ego may drool over the top-of-the-line model. Carefully evaluate your needs before you shop. If winning races is important, or if you have a lot of money invested in Ni-Cds, you'll definitely want a high-quality unit. On the other hand, if you're not too serious about the hobby (yet), you can make do with one of the simpler models. In any case, proper charging gets more power from your batteries and makes them last longer.

For maximum life, Ni-Cd batteries should be charged at  $\frac{1}{10}C$  rate ("C" is capacity divided by hours). For example, C for a 1700mAh battery would be 1.7 amps, so  $\frac{1}{10}C$  would be 170mA.

### SIMPLE CHARGERS

• **Trickle-chargers.** Chargers that work near the  $\frac{1}{10}C$  rate are called trickle-chargers;

## Battery Maintenance

Two things are bad for Ni-Cds: overcharging and defective memory. Overcharging will quickly and permanently ruin a battery by boiling off electrolytes. Once that has happened, a battery will never perform as well.

Memory is built up through charge cycling Ni-Cds, and a defective memory will cause poor performance. Every time you use your battery, you need to use 100 percent of its capacity—no less. Hitting 100 percent isn't always easy, but with care, you can keep your batteries at their best.

Both overcharging and defective memo-

ry can be avoided by carefully charging and discharging. In a nutshell: you charge your battery to 100-percent capacity, then discharge it all the way to zero capacity (not zero volts!). If you completely discharge the battery in your car, i.e., it no longer runs, that's great. But if you have charge left at the end of a run, you must still discharge the battery completely before you recharge it.

You don't need a bench full of equipment to take care of your batteries; however, a well-chosen charger and discharger will make the job quick and easy.

they're small and inexpensive. Unfortunately, it takes 12 hours to charge a battery at this rate. It's impossible to be sure when your batteries are charged, so most people overcharge them a little. Although charging at this rate doesn't generate excessive heat, batteries charged in this way don't perform as well as those charged by other means.

Trickle-chargers are fine to use on emergency batteries (such as those in smoke detectors and flashlights) that are always on charge, and for batteries that aren't charged often (such as transmitter batteries). But trickle-chargers aren't practical for R/C racers.

• **Constant-voltage charger.** Fortunately, Sanyo and Panasonic have developed Ni-Cds that can tolerate a higher rate of charge—as high as 2C to 3C. This means that an R/C battery can be fast-charged in as few as 20 minutes.

The simplest fast-charger is the constant-voltage charger. Most simple units with a timer fall into this category. They supply 1.5 to 2 volts per cell (depending on the model), but their current changes as the battery is charged. Output current is proportional to the difference between the output voltage and the battery voltage. As the Ni-Cd's voltage rises from 1 volt dead to 1.35 volts (no load) charged, the charger current drops from 3 to 5 amps to 0.5 to 1 amp.

When you use a constant-voltage charger, it's hard to tell when your battery is charged. Battery voltage alone is meaningless, and you can't rely on the 15-minute timer. Fifteen minutes is a "safe" charging time that will prevent you from overcharging. It will also prevent you

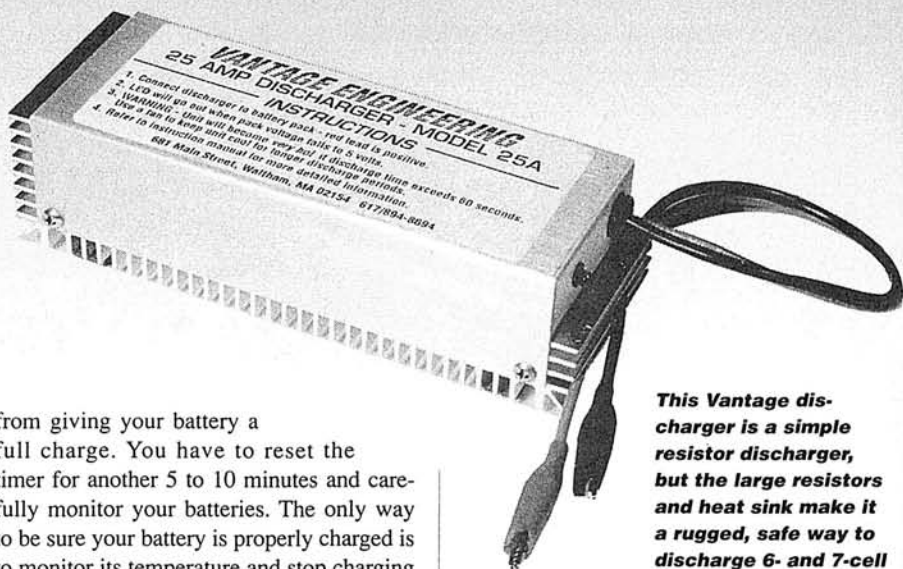
from giving your battery a full charge. You have to reset the timer for another 5 to 10 minutes and carefully monitor your batteries. The only way to be sure your battery is properly charged is to monitor its temperature and stop charging when it becomes slightly warm.

### SOPHISTICATED CHARGERS

• **Peak detection.** Constant-current chargers are superior to constant-voltage units. Only when a Ni-Cd battery gets a constant charging current can you use a technique called peak detecting to tell when the battery is fully charged. As a Ni-Cd is charged, its voltage steadily rises until it's fully charged. When you charge beyond this point, the battery voltage actually drops. Peak-detecting chargers can use analog or digital methods to determine the peak, and they'll stop charging when the battery reaches its optimum charge.

• **False peaks.** When a charger misreads a peak and shuts off prematurely, it's called false peaking. Analog peak detectors are susceptible to this (especially in AC units). Line noise, temperature drift and cell condition can all cause faulty peak readings. Digital peak detectors, on the other hand, aren't sensitive to these things and are less likely to false peak. Some newer peak chargers allow you to adjust the sensitivity of the peak detection.

If you have enough patience, you can peak a battery yourself with a digital voltmeter. Keep in mind that peak voltage varies from pack to pack. Connect the meter leads across the battery pack termi-



**This Vantage discharger is a simple resistor discharger, but the large resistors and heat sink make it a rugged, safe way to discharge 6- and 7-cell packs.**

nals. Watch the meter closely, and stop charging when the voltage drops below its peak.

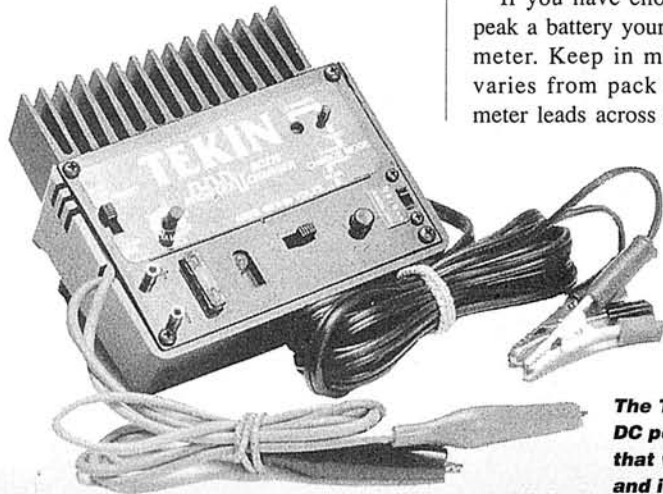
• **Pulse chargers.** The chargers I've mentioned are all linear chargers. They supply positive current while they're charging. Pulse chargers operate on a different principle; they deliver current in quick on/off pulses. Because they supply current only part of the time, the peak current can be

## How to Charge

**M**ake sure your batteries are at ambient temperature before charging. You can charge R/C batteries at 2C to 3C (up to 4C with a reflex charger), but for long life, don't exceed 3.5 to 4 amps. Many chargers can be adjusted to charge above and below this range, so you can make tradeoffs between performance and battery life.

Panasonic P170 and Sanyo SCE cells can't tolerate as much current as SCR and SCRC cells. Furthermore, they can be charged only once a week. If you charge them more often than that, use a reflex charger, or they won't last long. Some racers believe that SCE and P170 cells last longer if you trickle-charge them for 15 minutes before going to fast charge.

Many racers charge their batteries the night before a race and then re-peak them once or twice a few minutes before the race. Because re-peaking time is short, you can use up to 8 amps (use 1 amp above your normal charge current for SCEs and P170s). Peaking is designed to warm the battery and cram in a little extra energy. Don't use a reflex-mode charger for re-peaking.



**The Tekin BC210 is a modern DC peak/pulse/reflex charger that will charge any Ni-Cd, and it will almost fit in your pocket.**



## CHARGING/DISCHARGING BATTERIES

higher than the normal 2C or 3C of linear chargers. Average current is the same, so they don't charge your batteries any faster. Higher peak current provided by pulse charging, however, is believed to give Ni-Cds a greater charge and a slightly higher voltage.

Most pulse chargers have peak detectors, and digital detectors are the norm because they can overcome interference from the charging pulses. Pulse chargers are among the best available.

• **Reflex chargers.** The newest type of charger is the reflex charger (what Tekin\* calls its Power-Flex). Reflex chargers are pulse chargers with a twist. Our habit of fast-charging and discharging causes crystals to be deposited on the Ni-Cd electrodes. These deposits reduce the electrode's area and result in lower voltage and current. As reflex chargers pulse, they regularly reverse the current. This "burping" breaks up the crystals and rejuvenates weakened batteries.

It isn't a good idea to use reflex charging every time you charge your batteries. If you take good care of your batteries, i.e., fully discharge them, you won't need to use a reflex charger often. Use it if you've mistreated your batteries or if they get

weak. For example, use reflex mode if you recharge P170 or SCE batteries without having given them a week to rest.

### AC or DC?

Most chargers operate from a DC power supply, such as a car battery. DC chargers are small and efficient; but, they aren't as convenient as AC

units. You have to connect a DC charger to your car's battery or cigarette lighter; if you race indoors, you need to lug around a car battery. High-current DC power supplies are available, but they may cost more than the charger.

AC chargers, on the other hand, use a 110V household current. Most AC chargers use transformers to reduce the voltage, so they tend to be large, get hot and have lower current output. To keep costs down, some makers use transformers that are too small, and cheap AC chargers don't last long.

Because AC chargers get hot, they should have a fan to keep them cool.



**A group of no. 1157 bulbs in parallel will discharge a pack quickly.**

Inexpensive chargers don't have a fan and may not even have a heat sink. I've had several, and it doesn't take long to burn out the transformer. Better AC units have heat sinks or slots into which you can blow air from a separate fan. Better yet, look for a model with a built-in fan and thermal-overload protection.

DC chargers can get hot, too, but an external heat sink is all that's needed to prevent burnout. A word of caution: AC and DC heat sinks can get hot enough to burn you.

### THE UN-CHARGER

Ni-Cd batteries will run down all by themselves if you leave them alone. So why would anyone want a separate discharger? Well, discharging is an important part of battery maintenance. You do want your batteries to last more than a few runs, don't you?

Because Ni-Cds become conditioned to the current your motor usually draws (performance memory), it's best to completely discharge your batteries at this rate. Stock motors and some modified motors draw an average of 20 amps during a race. Some modified users prefer closer to 30 amps. So if you can't fully drain your battery in your car (owing to a crash, rain, supper, or whatever), you should use a discharger to finish draining it.

### BUILD OR BUY?

You have a couple of inexpensive options. Many chargers have a discharge setting, too. They discharge at 3 to 5 amps; but this is better than not doing it at all. Another inexpensive option is to make a light-bulb discharger. Just solder together 10 no. 1157 taillight bulbs in parallel, and attach alligator clips or a connector that mates with your battery. Keep your battery on the discharger until the lights dim. Be careful,

## Choose a Charger

Catalogues list almost as many chargers as R/C cars, and that means you have a tough choice to make. It also means that you should be able to find a charger to suit your needs perfectly. First decide whether you want AC, DC, or both. DC-only models are nice and small; I like them when I go off-road racing. But they require a car battery, so they aren't convenient for indoor racing or backyard driving. AC units cost a little more, but they usually have DC capability as well. If you pick an AC charger, make sure it has a built-in fan or has a provision for external cooling.

Current and voltage meters let you monitor charging progress, show whether the charger is working and help you to weed out bad batteries. Adjustable current is important if you want to charge different types of battery (SCR, P170, SCRC, etc.). It also makes the charger useful for charging other Ni-Cds you might own (transmitter or receiver batteries, maybe?).

I've seen chargers sell for \$20 to \$2,000, but most fall in the range of \$75 to \$200. If you're willing to stand watch over

your charger, you can get by with an inexpensive model. But keep in mind that a top-end charger could save you money because you won't have to buy new batteries as often.

### CHARGER TIPS

- Trickle chargers aren't cool; stay away from them unless you drive only occasionally.
- Timed linear chargers are probably the most economical, but you have to keep your eye on them. You can't count on the timer to give you a perfect charge.
- A peak charger is definitely your best bet if you want a perfect charge but don't want to baby-sit batteries while they're being charged.
- A reflex charger is a luxury, but if you want to rejuvenate old batteries or to try to squeeze the last ounce of performance out of your batteries, it may be just the ticket.

If you're Donald Trump, get two or three of each, then send me the ones you don't like.



because bulbs can break, and they get dangerously hot. They can also discharge your battery too far, so don't let the lights go out.

If you don't want to build your own, several manufactured dischargers are available. A simple one uses resistors and an LED in place of the light bulbs. The store-bought unit is usually safer. And resistors aren't as likely to over-discharge a battery as light bulbs are. (Light bulbs draw more current when the light goes out and the filament cools down.)

If you want to go all-out, Competition Electronics\* make battery conditioners that can charge, discharge and match your batteries. Other dischargers offer variable discharge curves to simulate racing conditions. These are more for battery conditioning than routine maintenance, but they may be useful to serious racers.

## DISCHARGE, THEN EQUALIZE

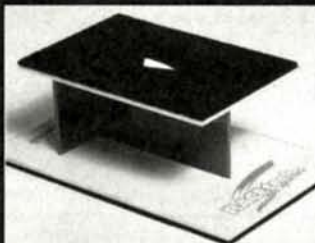
Experts recommend that you equalize battery packs after they've been discharged. No two cells are identical, and quickly discharging a pack won't discharge all cells evenly. Equalizing is a slow discharge that brings all cells to the same level. Some people recommend that you connect a 30-ohm resistor across a battery that is discharging overnight. Don't, however, leave it on longer than overnight.

If you use side-by-side packs, you can buy or build a very good equalizer in the form of a discharge tray. It holds the battery and puts a single 5 ohm (1/4W) resistor across each cell (hard to do with a stick pack). This ensures that all the cells are discharged equally. Whichever method you use, discharge to 0.9 to 1 volt per cell.

None of this is very complex, but there are many variables to consider. The payoff in choosing the right combination of charger, discharger and maintenance routine is that your batteries will give you top performance for a long time. It's up to you to decide how much time you want to spend caring for your batteries and how much money you want to spend on a charger and discharger.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 200.

# RACETech motor sports



**#9059 Tall Car Stand...**  
3" tall, perfect for off road car. Also Available in 1 5/8" tall version for 1/10 or 1/12 scale...  
.....\$17.95



**#9063 EV10SS Battery Brace...**  
Eliminates the need for taping or gluing the batteries together, fluorescent Pink or yellow.....\$7.95  
PN#9062 EV10 on road car.....\$7.95

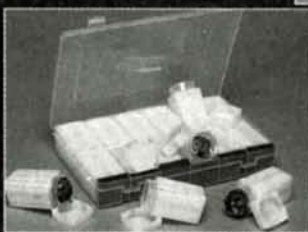
**#9042 Motor Break-in Stand...** Holds motor while breaking in brushes. Includes fan blade. Neon colors... \$8.95



**#9250 Associated Caster Kit...**  
Adjust caster by simply turning a wrench. No more lost shims, and you set it exactly where you want. Kits available with graphite front braces...  
#9250 Standard kit... \$8.95  
#9252 12L w/Braces... \$15.95  
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**#9001 Caster/Camber Gauge...** Made especially for the TRINITY EV10. Measurements are taken directly from the king pin. Models also available for Revolver 12 and Associated "STRUT" style front ends.  
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Stores and organizes up to 12 motors in the motor tubes provided. Priced less than buying the 12 tubes separately...\$19.95



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Attaches to any stock motor to quickly pre-seat new brushes or to make "lay-down" type brushes. Includes .290" dia. cutting stone...\$24.95

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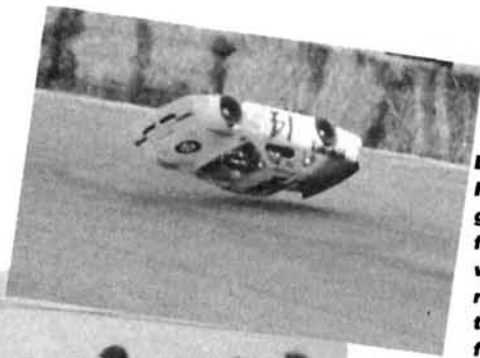


From the track to the parking lot.  
This is the R/C action as **you** see it.

# Grassroots

# RACING

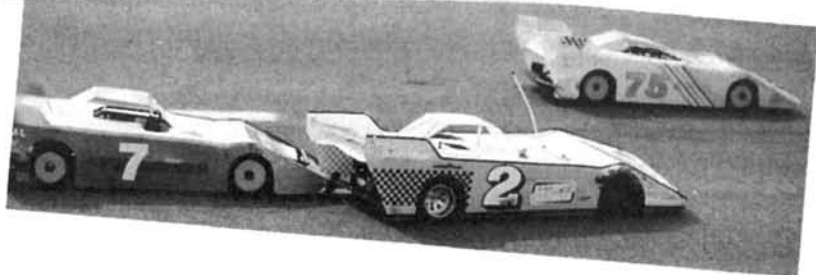
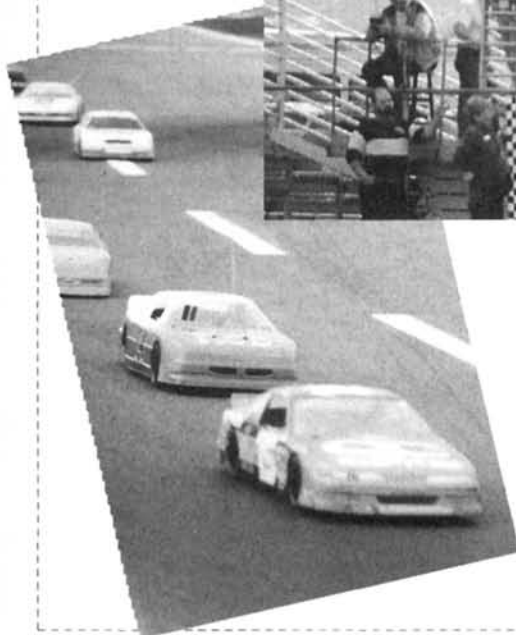
**T**his is YOUR PAGE—YOURS!! It belongs to you, the optimistic local racer on a budget who's looking for some evenly matched action; the individual who's in it for the fun of it all: the grassroots racer—whether on-road or off-road. We at *Car Action* really do want to see your tracks, your cars and your local heroes—men, women, boys and girls (we love cats and dogs, too!). Show us your local racing scene! Send photos with captions to Grassroots Racing, *Radio Control Car Action*, 251 Danbury Rd., Wilton, CT 06897-3035.



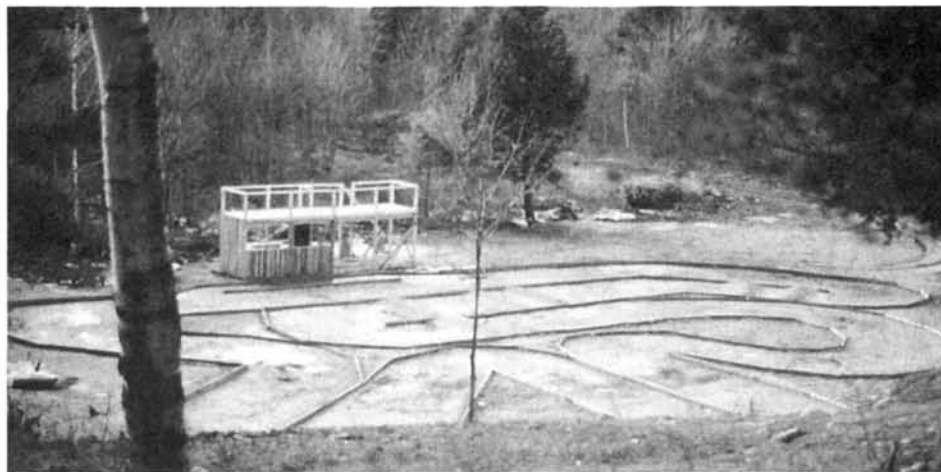
**Brad Franks** goes for a wild ride in turn four.



**Starter Gale King** addresses the Grand National drivers before the race.



**Fierce competition in six classes of racing highlighted the Quarter Scale Racing Association of Southern California's Goodwill 300 national event last February in Lake Perris, CA. Ninety racers from all over the United States provided plenty of action, thrills and spills.**



**Keith Anderson and Danny Brideau** from the East Templeton Model Raceway club in East Templeton, MA, sent us this photo of their new off-road track. They plan a full season of racing this summer with races to be held every Sunday. If you're interested in joining the fun, call Keith at (508) 249-4771.

## Tamiya Championship Series Race #11:

# The Challenge Continues

by John Wicht

The 11th Tamiya Championship Series Race was held on February 26, 1995, at S&N Trackside Hobbies in Glendale, WI. Some 88 Tamiya car owners arrived to test their racing skills at the Midwest's biggest Tamiya race. This was the first time that the series was raced indoors on a carpet track. Another first was the addition of the 4x4 truck class, which ran on the same roadcourse as the other classes but with portable jumps that were added to make the course more challenging. With S&N Trackside Hobbies filled to capacity with racers and spectators, the racing excitement began.

### QUALIFYING

The qualifying proved to be close. F1 Stock was a heated battle for the pole between Mike Wenzell and Bruce Hickman, who were separated going into the A-Main by  $\frac{2}{10}$  second. For most of the weekend, Scott Douglas dominated the F1 Modified and TQ'd with almost a full lap over second spot. Sedan Stock was also



For the first time ever, the 4x4 Racing Truck class lines up for the A-Main.

spot, Scott Douglas, until he got caught up in lapped traffic at about the 2-minute mark and Scott Douglas took the win.

• **Sedan Stock Main.** This proved to be the best run for Charlie Suangka, who

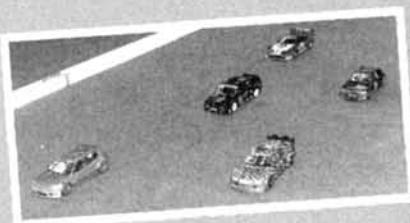


All of the first-, second- and third-place winners got together for this Kodak moment.

led from tone to tone to win the Sedan Stock title with few challenges.

• **Sedan Modified Main** was a heated battle between Scott Ernst and Jeff Stevens. Jeff Stevens went on to win at the line by 2 seconds.

• **4x4 Racing Truck Main.** This was the first time in the history of the Tamiya Championship Series that this new class was run, and it had a fairly good turnout—six participants raced in the Main. I led the A-Main for 4½ minutes, but in the final seconds, I slammed a



The Modified Sedan class racers battle for the TQ spot.

a battle between Greg Roshon and Charlie Suangka. Greg went on to TQ by 2.2 seconds. Sedan Modified was a close race between Jeff Stevens and the host of the event, Scott Ernst, but Jeff held on to the pole by almost a lap. The 4x4 Racing Truck class was a fight for the pole between yours truly and Peter Phillips; I held on by 5 seconds.

### THE MAIN EVENT!

• **F1 Main.** This proved to be the battle of the drivers. Mike Wenzell and Jeff Howard went head to head for more than 2½ minutes. But when Jeff attempted a pass prematurely, he tapped the board and got caught up in lapped traffic for the remainder of the race. Mike Wenzell went on to win the F1 Stock title.

• **F1 Modified Main.** Greg Hilber had almost a half a lap lead over second



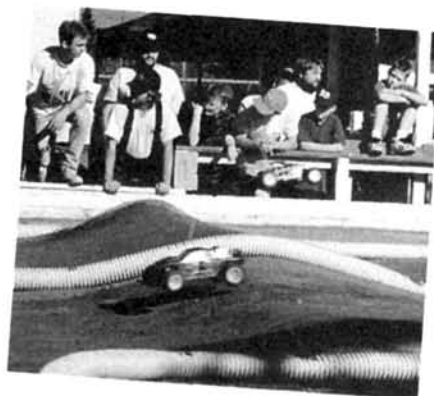
F1 racers take the track.

wall and Peter Phillips took the win.

One of the best things about the Tamiya Championship Series Races is that they offer a good time to all, regardless of age or skill level. This year was no exception; a good time was had by all. ■



Competition Racing Association's Summer Shootout in Portland, OR, attracted over 145 drivers for a great day of off-road racing. In addition to the two-day shootout, the club plans a full off-road and dirt oval racing season. For more information, call (503) 668-3350.



### call now!

If you're a dealer or just a bunch of fun-lovers in search of a race program, call now! Here's a few hotline phone numbers that you can use if you have any questions, or if you'd like to start a program in your area.

**Bolink Legend Series**  
(404) 963-0252

**Hobby Shack Parking Lot**  
(714) 964-8846

**Hobby Town USA Parking Lot**  
(402) 434-5050

**Kyosho R/C Sport Racing**  
(800) 682-8948, ext. 085F

**Tamiya R/C Championship Series**  
(800) TAMIYA-A

**Trinity's Street SPEC Series**  
(908) 862-1705





# Rebuild Your Transmission

by JACK JOHNSON

## GOODBYE GEAR GRINDING

**T**HE R/C CAR industry has come a long way! Some of today's racers use the same technology and have the same equipment as full-size race cars. Off-road R/C car transmissions have progressed as much as other car parts. They're lighter, have a lower center of gravity (CG) and include slipper clutches to absorb some of the impacts that they encounter.

The heart of any off-road car is its transmission, and if properly maintained, it can make the difference between winning and losing a race. Like anything else, there are "secrets" to maintaining and building transmissions, and I'll try to pass on some of the more useful ones to you.

## Make a DIFF-ERENCE

The transmission's most important part is the differential (diff). If the diff doesn't operate smoothly, it can seriously affect your car's handling.

- **Smooth diff.** This will make your vehicle accelerate straighter out of corners and will generally make your car easier to drive.
- **Grinding, gritty diff.** It's time for a rebuild. If the diff feels tight and binds, your vehicle will have less traction when accelerating through corners, and it will feel looser when it leaves them.

The diff must *never* be allowed to slip. If you notice the diff starting to slip, immediately *stop driving* and tighten the diff adjustment. The longer you run your car with a diff that slips, the more you'll damage the diff balls and rings. Slipping is the most common cause of diff damage, and it's usually the cause of the gritty feel.

## How can you prevent the diff from slipping?

This is where the slipper clutch really comes into play. To protect the diff from slipping (and help you avoid a premature diff rebuild), adjust the slipper so that it *always* slips before the diff. Slipper clutches were originally designed to help you drive on slippery surfaces, but the protection that they offer the diff and tranny is their greatest advantage. Using a slipper allows you to run a slightly looser diff because the slipper absorbs most of the impact to which the gears would usually be subjected. This slightly looser adjustment greatly improves a vehicle's overall handling.

## LUBRICATE FOR LIFE!

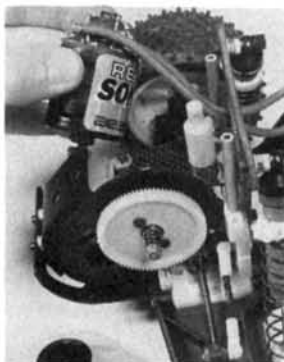
To make the transmission run a little more quietly, lubricate the gears. This definitely isn't a necessity because today's transmissions are very precisely manufactured, and the gear mesh is very good. But it will make the tranny quieter, and it seems to make the gears last longer.

A couple of lubricants work very well for this:

- If you own a Hydra-Drive slipper

clutch, you already have one: Hydra-Drive fluid (the thicker, the better). Put a little on every gear before you reassemble the transmission.

- The other lube is made by Aero-Car Technology\*, and I've used it for years. It's Super Speed Gear Lubricant. This looks almost like a wax and is brushed onto the gears. When the gears rotate, the lube is heated, liquefies and penetrates the gears. I swear by it. Not only does it make the transmission quieter, but it also seems to make the gears last longer.



**First, remove the spur-gear cover and the motor from the car. Check the pinion and spur gears for excessive wear or foreign objects.**

## TIME FOR A TEAR DOWN

- Start by removing the gear cover and the motor.
- Remove the transmission. This usually requires the removal of four to six screws. Work over an old towel or rag, so if you drop any of the small parts, they'll be caught on the fabric instead of rolling away. This also helps to protect whatever you work on—

workbench or kitchen table.

- Remove the screws that hold the tranny case halves together, then carefully open the case. When you separate the case halves, try to keep all the gears in one half.
- Mark the exposed sides of all the gears before you remove any of them. This way, when you reassemble the transmission, you'll be able to position the gears so that they turn in the same direction as before. I know this doesn't sound like a big deal, but it will make a difference to how quiet the transmission is. If you put the tranny back together with the worn side of one gear against the fresh side of another, it will get pretty noisy.
- Having marked the gears, remove them from the tranny half.
- Remove the bearings from the tranny halves.
- Check inside the tranny halves for dirt, grease and any other buildup, and clean it off.
- Inspect the bearings. Do they operate freely? Replace any that don't.
- Check the gears for excessive wear. If the gear profile shows a noticeable impression of the teeth from another gear, or if the tips of the gears form a sharp point, the gears need help. Excessively worn gears should be replaced with new ones. After inspecting the gears, put them back into one half of the transmission. Everything except the diff should be back in place.



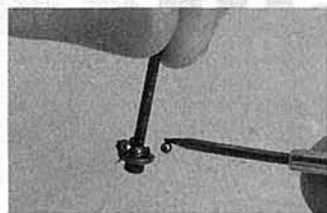
**Mark the gears with a permanent marker so that you'll know how to position them when you reassemble the transmission.**

PHOTOS BY WALTER SIMS

# DIFF-ICULT Operation?

Relax! It won't be that bad.

- Start by disassembling the diff (working over that old rag!). It should come apart when the adjustment screw has been removed.
- Thoroughly clean all the thrust-bearing pieces to remove dirt and grease. If you have small, loosely mounted diff balls for the thrust bearing and your diff was extremely gritty, you may want to replace the balls.
- Having cleaned the thrust-bearing pieces, reassemble it. Start by greasing one of the small



**The small balls and washers of the thrust-bearing assembly are often the underlying cause of the diff's feeling "gritty." When reassembling, use lots of grease.**

washers. You can never have too much grease on the thrust bearing, so put a lot on.

- Place either the thrust-bearing "cage" or the small diff balls next to the first thrust-bearing washer. When the balls are in place, do one of the following:

—If you have a thrust-bearing cage, grease the exposed side of it and install the second thrust bearing washer next to it.

—If you have the small, loose diff balls, grease the second thrust-bearing washer and install it next to the diff balls.

- It's time to look at the large diff gear and the large diff balls. Remove all the diff balls from the gear, and clean them thoroughly. Be careful with these; they're easy to lose and can roll away when you least expect it. Again, if your diff felt extremely gritty, you may want to replace these diff balls.

- Clean the gear to remove grease and dirt. You can use a small pipe cleaner to clean the diff-ball

holes in the gear.

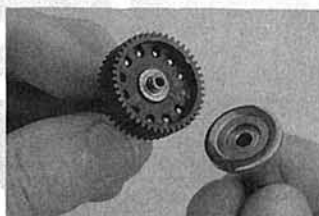
- If your gear shows excessive wear, replace it.

• Put all the large diff balls into the holes in the diff gear, and then grease both sides of them. The diff balls usually snap into the holes and stay there. If they don't, you'll need to install the diff gear on one half of the differential before you insert the balls.

- Having greased both sides of the diff balls, set the diff gear aside for a couple of minutes while you prepare the diff halves.

• Remove the large diff washers from the two diff halves. If your diff is in the bottom of the tranny, and the diff halves are also outdrives, inspect them for wear. If a slot has been worn in the diff halves (outdrives) where the dog-bone or swing-shaft pins rub against them, replace them. A worn outdrive can adversely affect your car's handling, especially on bumpy surfaces.

- Clean the large diff washers in the same way as you cleaned the other parts. If only one side of each washer has been used, flip the washers over and use the



**Inspect the diff balls and rings for wear, and replace them if necessary. Some rings can be flipped around to provide a new, un-worn surface on which the diff balls will ride.**

fresh sides. If both sides have been used, replace the washers. Attach the washers to the diff halves, and put the greased diff gear into place.

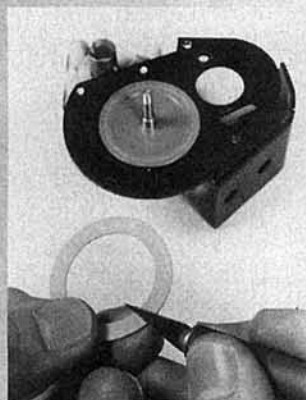
- Reassemble your diff according to the kit's instructions. If a small locknut holds the diff screw in place, use a new one to ensure that the diff's adjustment doesn't change so that it slips and causes damage.

- Install the diff in the transmission half, making sure that the diff-adjustment screw faces the correct side of the tranny.

- Attach the other diff half and reassemble the transmission.

## Slipper SURVEILLANCE

Before installing your rebuilt tranny, remove the slipper adjustment nut and disassemble the slipper. Inspect the slipper pad for wear. If the slipper pad is egg-shaped because it's worn, replace it. To remove glaze buildup, carefully scrape the pad with a hobby knife. If the pad is not "keyed" and slips against both slipper plates,



**To remove glazing from your slipper-clutch pad, lightly scrape its surface with a sharp hobby knife.**

scrape both sides. If the pad is "keyed" and slips against only one plate (like a Losi-type slipper), simply flip the pad over so that the fresh side will be against the backplate.

Remove any slipper-pad residue from the back of the slipper plate. To do this, use ultra-fine, wet-type, 2,000-grit sandpaper, a Scotch-Brite pad, or fine steel wool. Whichever material you use, lay it on a flat surface and rub the slipper plate against it in a circular motion (as though you were waxing a car). Remember "The Karate Kid": "Wax on. Wax off!"

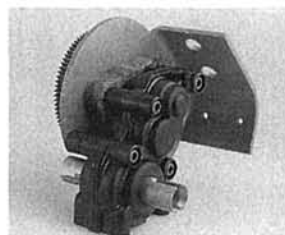
- After you've freshened up the slipper pad and backplate, reassemble the slipper clutch, but first, check the spur gear for small lumps of dirt, little stones and any other foreign objects that might be wedged between the gear teeth. Remove anything that doesn't belong. You can replace the spur gear if you think it's real-

ly bad. You probably won't notice any difference in performance, but your vehicle will be quieter. If you replace the spur gear, replace the pinion gear, too. If you replace only one of these gears, the old one will soon wear out the new one.

If you run where it's dusty or sandy, you might want to seal your reassembled tranny by running thin tape around the seam in the housing. This will help to keep the inside clean and the tranny will last much longer.



**If you run your car in dusty conditions, run a small piece of tape around the transmission's case halves to seal out unwanted dirt.**



## WASN'T THAT EASY?

See! That wasn't so bad, now, was it? There's really no need to be afraid of rebuilding your transmission. Like most of the parts on today's R/C cars, trannys are pretty simple and easy to work on.

Remember that a little preventive maintenance goes a long way. If you frequently check the diff's adjustment and regrease it and you keep the inside of your tranny clean, you'll dramatically increase its life.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 200.



## INDEX OF MANUFACTURERS

**Aero-Car Technology**, P.O. Box 336, Western Springs, IL 60558-0336; (708) 246-9027.

**Airtronics**, 11 Autry, Irvine, CA 92718; (714) 830-8769.

**Associated Electrics Inc.**, 3585 Cadillac Ave., Costa Mesa, CA 92626-1403; (714) 850-9342; fax (714) 850-1744.

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**Bennett Equipment**, 900 E. 1300 S., Romney, IN 47981-9619; (317) 538-2725.

**BME**, 1735 Rte. 9 N., Howell, NJ 07731; (908) 866-0595.

**Bolink R/C Cars Inc.**, 420 Hosea Rd., Lawrenceville, GA 30245; (404) 963-0252; fax (404) 963-7334.

**Competition Electronics**, 3469 Precision Dr., Rockford, IL 61109; (815) 874-8001.

**Deans Connectors**, 7628 Jackson St., Paramount, CA 90723; (310) 634-9401.

**DuraTrax**; distributed by Great Planes Model Distributors (see address below).

**Dynamite**; distributed by Horizon Hobby Distributors (see address below).

**Futaba Corp. of America**, P.O. Box 19767, Irvine, CA 92713-9767; (714) 455-9888; fax (714) 455-9899.

**Great Planes Model Distributors**, P.O. Box 9021, Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-1104.

**Hammer Pro**; distributed by Novak Electronics (see address below).

**Horizon Hobby Distributors**, 4105 Fieldstone Rd., Champaign, IL 61821; (217) 355-9511; fax (217) 355-8734.

**Hot Shoes**, P.O. Box 1277, Mississauga "B" Station, Ontario, Canada L4W 2G4; fax only (905) 569-1528.

**HPI**, 22600-C Lambert, Ste. 904, El Toro, CA 92630; (714) 837-3250; fax (714) 837-3251.

**Japan R/C Imports**, P.O. Box 7009-152, Lafayette, CA 94549; (510) 284-5778 phone and fax.

**JR**; distributed by Horizon Hobby Distributors (see address above).

**Kimbrough Products**, 1322 Bell Ave., Unit 1-C, Tustin, CA 92680; (714) 258-7425; fax (714) 258-7426.

**Kyosho/Great Planes Model Distributors**, P.O. Box 9021, Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-1104.

**Litespeed**, P.O. Box 4765, Spokane, WA 99202; (509) 535-2717.

**Loctite**, 18731 Cranwood Ct., Cleveland, OH 44128.

**Mighty Motors**, 44 Winding Rd., Hicksville, NY 11801; (516) 932-1688.

**MIP**, 746 E. Edna Place, Covina, CA 91723; (818) 339-9008; fax (818) 966-2901.

**MonoKote**; distributed by Great Planes Model Distributors (see address above).

**Novak Electronics**, 18910 Teller Ave., Irvine, CA 92715; (714) 833-8873; fax (714) 833-1631.

**O.S. Engines**; distributed by Great Planes Model Distributors (see address above).

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**Pro-Line**, P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; fax (909) 849-2968.

**PTI/Hyperdrive**, P.O. Box 950, Pilot Mountain, NC 27041-0950; (910) 368-1375; fax (910) 368-1380.

**Quarterflash**, 16301 S. Santa Rita, #C, Sahuarita, AZ 85629; (602) 625-9274.

**Race Prep**, P.O. Box 494, Paulden, AZ 86334; (602) 636-1955; fax (602) 636-1956.

**Racetech**, 4406 14th Ave., Parkersburg, WV 26101; (314) 531-3003; fax (314) 531-5678.

**Raceway Mfg.**, 283 S. Janice Ln., Ormond Beach, FL 32174; (904) 677-2635.

**Radical Racing Products**, 1402 Linda Ln., Raymond, MS 39154; (601) 322-2932.

**Raytek**; distributed by Racer's Choice, P.O. Box 405, Medinah, IL 60157; 60157.

**Reedy**; distributed by Associated Electrics Inc. (see address above).

**Rocket City**, 103 Wholesale Ave. NE, Huntsville, AL 35811; (205) 539-8358.

**Schumacher Inc.**, 6302 Benjamin Rd., Ste. 404, Tampa, FL 33634; (813) 889-9691; fax (813) 889-9593.

**SCI Power Corp.**, Bossigasse 45, A-1130, Vienna, Austria.

**Tamiya America Inc.**, 2 Orion, Alliso Viejo, CA 92656-4200; (800) TAMIYA-A; fax (714) 362-2250.

**Team Losi**, 13848 Magnolia Ave., Chino, CA 91710; (909) 465-9400; fax (909) 590-1496.

**Tecnacraft**, 200 Meadow View Dr., Grayson, GA 30221; (404) 995-1560; fax (404) 995-1523.

**Tekin Electronics**, 940 Calle Negocio, San Clemente, CA 92673; (714) 498-9518; fax (714) 498-6339.

**Testors**, 620 Buckbee St., Rockford, IL 61104; (815) 962-6654; fax (815) 962-7401.

**TRC**, P.O. Box 1058, 210 Charter St., Albemarle, NC 28001; (704) 982-0507; fax (704) 982-0672.

**Trinity Products**, 1901 E. Linden Ave., #8, Linden, NJ 07036; (908) 862-1705; fax (908) 862-6875.

**Wolfe Motorsports**, 9431 Tedford Ln., Knoxville, TN 37922; (615) 693-4665.

**World Class**, 1430 Florida Ave., Ste. 217, Longmont, CO 80501; (303) 684-9450; fax (303) 684-9613.

**Wood Racing**, 405 Virginia St., Auburn, MI 48611; (800) 424-WOOD.

**Yokomo**, P.O. Box 5872, Orange, CA 92613; (714) 921-0322; fax (714) 921-0134.



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**R/C Hi-Tech Raceway**, 3303 Meridian St., Huntsville, AL 35811; Rick Chambers, (205) 539-1347.



**R/C Super Cross**, 2706 Lagoon Park Dr., Montgomery, AL 36109; Mike Gardner, (205) 262-0048



**Spring Cove Speedway**, Rt. 1, Box 95, Florence, AL 35630; Chuck or Lyda Sypolt, (205) 757-5998



**Thunder Road International Speedway**, 108 Park Rd., Pleasant Grove, AL 35127; Jim Kearney, (205) 744-0107



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**ARCORR**, 2812 Spennard Rd., Anchorage, AK 99503; Jim Rafuse, (907) 277-7778 (weekends only)



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**Finish Line Raceway**, 7025 E. 21st St., Tucson, AZ 85710; Jerry Kikkert, (602) 747-3633



**Frank's Hobby House**, 19401 N. Cave Creek Rd., Phoenix, AZ 85024; Marty, (602) 992-3495



**G&S Raceway**, 967 Hancock, Bullhead City, AZ 86442; Bob Olsen, (602) 758-1100



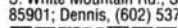
**Havasut Raceway**, 1400 S. Smoketree (Rotary Park), Lake Havasu, AZ 86403; Bernie Coates, (602) 855-2966 or (602) 855-4666



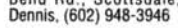
**The Hobby House**, 508 E. 22nd St., Yuma, AZ 85364; Harold, (602) 782-9644



**HobbyTown Mountain Raceway**, 4431 S. White Mountain Rd., Showlow, AZ 85901; Dennis, (602) 537-9373



**HobbyTown Raceway**, 9180 E. Indian Bend Rd., Scottsdale, AZ 85250; Dennis, (602) 948-3946



**HobbyTown Raceway**, 1915 East Baseline Rd., Gilbert, AZ 95234; Kenny, (602) 892-0405



**Hobbytown Raceway**, 2814 W. Bell Rd., Phoenix, AZ 85023; Mike Kaminski, (602) 993-0122



**Quarter Flash's Squirting' Dirt Raceway**, 16301 S. Santa Rita #C, Sahuarita, AZ 85629; Dave or Randy, (602) 625-9274



**R/C Sports Mania**, 3550 N. 35th Ave., Phoenix, AZ 85017; Brian Dick, (602) 278-3671



**Scottsdale R/C Raceway**, 3023 N. Scottsdale, Scottsdale, AZ 85251; Mike Dolan, (602) 829-9117



**Speedway Hobbies**, 1000 N. Humphreys St., #204, Flagstaff, AZ 86001; Gary McAllister, (602) 556-0710



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**Chico's 20th Street Raceway**, 236A W. East Ave., Chico, CA 95926; David Brown, (916) 893-6443



**City Speedway**, 7750 Conroy Ct., San Diego, CA 92111; (619) 560-9633



**Cloverdale R/C Raceway**, 1 Citrus Fair Dr., Cloverdale, CA 95425; Tom Kelley, (707) 586-9789; track, (707) 894-4468



**D&D Raceway**, 290 S. 1st Street, Turlock, CA 95380; Dave Miller or Lee Cisco, (209) 667-0907



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**Hobbies Emporium**, 1324 Vendels Cir. #111, Paso Robles, CA 93446; Rick Powers, (805) 239-0408



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**Hobby Tech**, 7932 Miramar Rd., San Diego, CA 92126; Henry Moller, (619) 586-1701



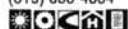
**Hobby Warehouse**, 5500 So. Watt, Sacramento, CA 95828; Roger Hubbard, (916) 381-7587



**Jake's Performance Hobbies**, 6650 Commerce Blvd. #21, Rohnert Park, CA 94928; Jake, (707) 586-3375



**JC High Desert Raceway**, Gorgonio Rd., Phelan, CA 92329; JC Fletcher, (619) 868-4834



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**K&M R/C Raceway**, 22474 A Barton Rd., Grand Terrace, CA 92324; Mike Blake, (714) 783-0899



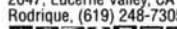
**KW Raceway**, 5630 Ager Rd., Montague, CA 96064; Keith Wilson, (916) 459-3787



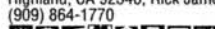
**Lodi's Radio Control Speedway**, 1033 Black Diamond, Ste. B, Lodi, CA 95240; Mike Belanger, (209) 334-5681



**Lucerne Valley Raceway**, 32800 Old Woman Springs Rd. #4, P.O. Box 2047, Lucerne Valley, CA 92356; Frank Rodrigue, (619) 248-7305



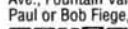
**Outlaw Hobbies**, 7920 Webster, Highland, CA 92346; Rick James, (909) 864-1770



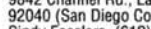
**Perris Recreation R/C Track**, 120 N. Perris Blvd., Perris, CA 92370; (909) 943-6603



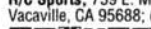
**R/C Off-Road Raceway**, 10810 Talbert Ave., Fountain Valley, CA 92708; Jeff Paul or Bob Fiege, (714) 965-9615



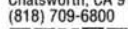
**R/C Racing Center and Hobbies**, 9842 Channel Rd., Lakeside, CA 92040 (San Diego County); Russ or Cindy Escalera, (619) 443-2270



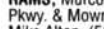
**R/C Sports**, 759 E. Monte Vista Ave., Vacaville, CA 95688; (707) 446-5555



**Race Prep Raceway**, 20115 Nordhoff, Chatsworth, CA 91311; Steve Dunn, (818) 709-6800



**RAMS**, Murco Plaza, Paseo Padre Pkwy. & Mowry East, Fremont, CA; Mike Alton, (510) 490-8734



**RCRC Hobbies**, 2069 Pacific Coast Hwy., Lomita, CA 90717; Rhea & Cliff Fisher, (310) 530-7272



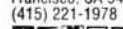
**Rickey Racers**, 14568 Arrow Hwy., Fontana, CA 92335; Steve Davenport, (909) 355-2661



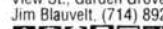
**R.R.W.**, 1844 W. Glenoaks Blvd., Glendale, CA 92335; Steve Davenport, (818) 240-2093



**San Francisco Radio Controlled Model Car Club**, 3136A Turk St., San Francisco, CA 94118; Randy Swan, (415) 221-1978



**So. Cal R/C Raceway**, 11930 Valley View St., Garden Grove, CA 92645; Jim Blauvelt, (714) 892-0088



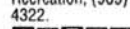
**SRS Raceway**, 915 N. Main St., Salinas, CA; (408) 424-4044



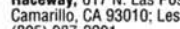
**Team Air Racing Club**, 18208 Imperial Hwy., Yorba Linda, CA 92686; Don or Nicky, (714) 579-7488



**Valley R/C Racepark**, 146 S. Santa Fe St., Hemet, CA 92344; Valley Wide Recreation, (909) 654-1505 or 658-4322.



**Ventura Roadrunners Freedom Park Raceway**, 617 N. Las Posas Rd. #107, Camarillo, CA 93010; Les Abramson, (805) 987-2901



**Wendy's Country Store and More/O.R.C.A. Racing Club**, 5475 Skyway, Paradise, CA 95969; Alan Evans, (916) 872-9363



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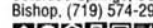
**Miracle R/C Speedway**, 4206 Wadsworth Blvd., Wheatridge, CO 80034; Rob Brossman, (303) 420-3051



**R/C Mini Sports**, 6401 Broadway, Unit G, Denver, CO 80223; John Weins, (303) 426-0110



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**R/C Madness**, 640 Enfield St., P.O. Box 64, Enfield, CT 06082; Christopher Marcy, (203) 741-6501



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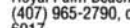
**Branford R/C Speedway**, Rt. 3, Box 240, Branford, FL 32008; (904) 935-0758



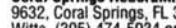
**Broward County R/C Race Club**, Mills Pond Park, Ft. Lauderdale, FL; Ed Augusto, (305) 525-3304



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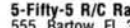
**Coral Springs Roadrunners**, P.O. Box 9632, Coral Springs, FL 33075; Randy Witte, (305) 474-5934 or Rick Schwartz, (305) 344-1983



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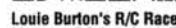
**Hobby World Raceway**, 7273 103rd St., Jacksonville, FL; Ray or Greg, (904) 772-9022



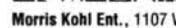
**Lake Whipoorwill International Speedway**, 12345 Narcoossee Rd., Orlando, FL 32827; Bob Hosch, (407) 277-9586; fax (407) 277-2568



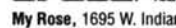
**Louie Burton's R/C Raceway**, 4215 Mustang Rd., Lakeland, FL 33803; Louie Burton, (813) 665-1322



**Morris Kohl Ent.**, 1107 W. Waters Ave., Tampa, FL 33604; Morris Kohl, (813) 931-1626



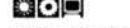
**My Rose**, 1695 W. Indiantown Rd., Jupiter, FL 33458; Mark Watson, (407) 744-3800



**NORRA**, 3300 Santa Barbara Blvd., Naples, FL 33942; Jerry Pecar, (813) 592-7562 or Mark Benfield, (813) 263-6861



**Ocala Radio Control Car Club**, 3500 SE 30th Terrace, Ocala, FL 34471; Steve Shook, (904) 694-5147



**Paul's Stadium Raceway**, 4511 W. Dr. M.L. King Jr. Blvd., Tampa, FL 33614; Paul Surette, (813) 872-8662



**PBG R/C Motor Park**, 6351 Barbara St., Palm Beach Gardens, FL 33410; Doug Gleason, (407) 743-9791



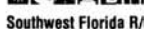
**Pro Hobbies Speedway**, 715 N. Lake Pleasant Rd., Apopka, FL 32712; (407) 886-4615



**Red's R/C Raceway & Hobbies, Etc.**, 1010 Creighton Rd., Pensacola, FL 32504; Linda Till, (904) 479-2330



**River City R/C Car Club**, 9711 Sharing Cross Dr., Jacksonville, FL 32257; Bill Fraden, (904) 268-1948



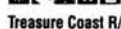
**Southwest Florida R/C Raceway**, 2425 Rivers Rd., Naples, FL 33964; Clyde Armstrong, (813) 455-1143



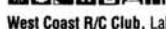
**Tampa Bay R/C Club**, P.O. Box 10224, St. Petersburg, FL 33733; Dick Gillette, (813) 526-0744



**Three Flags R/C Racetrack**, 1755 East S.R. 44, Wildwood, FL 34785; Don Meares Sr., (904) 748-3870; fax (904) 748-5263



**Treasure Coast R/C Club**, 4931 Oleander, Fort Pierce, FL 34982; Lou, (407) 464-3207



**West Coast R/C Club**, Lake Park, 17203 N. Dale Mabry, Tampa, FL 33549; Alex, (813) 920-7448; Bert, (813) 654-2554



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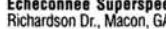
**Carnesville R/C Speedway**, Hwy. 145 S., Carnesville, GA 30521; Bill or Georgia Austin, (706) 335-9044 or 335-3381



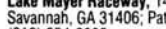
**Chafee Park Raceway**, 1800 Pearl Ave., Augusta, GA 30904; Darren Brooks, (706) 738-8929



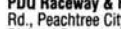
**Dalton Raceway**, 2300 Chattanooga Rd., Dalton, GA 30720; (404) 226-6699



**Echeconnee Superspeedway**, 2149 Richardson Dr., Macon, GA 31206; Andy Thompson/Cliff Kline, (912) 788-8731



**Lake Mayer Raceway**, 1430 Dale Dr., Savannah, GA 31406; Pat Rossiter, (912) 354-0098



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**Garden Isle R/C Racers**, P.O. Box 3593, Lihue, HI 96766; Eric Leano, (808) 246-8856



**Mauli R/C Racing Association**, 430 Hookahi St., #13, Wailuku, HI 96793; Tritsch R/CHobbies; (808) 244-0526



**Radio Control Hawaii**, 474 Kalanikoa St., S-104, Hilo, HI 96720; Glenn Shiroma, (808) 935-5629



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**Capital Dirt Burners**, 1945 N. Teare Ave., Meridian, ID 83642; Jim Brandon, (208) 888-7079



**Falls Hobbies & R/C Raceway**, 1515 Northgate Mile, Idaho Falls, ID 83401; (208) 529-8650

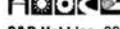


## ILLINOIS

**AJ's Raceway**, Kesslinger Road, DeKalb, IL 60115; A.J. Schult, (815) 756-2772



**BARR**, 809 River Dr., Byron, IL 61010; Jim Haynes, (815) 234-5615



**C&R Hobbies**, 39 E. Jones, Milford, IL 60953; Ray Craighead, (815) 889-4073



**Cedarville R/C Speedway**, 430 W. Washington, Cedarville, IL 61013; Troy Pokoj, (815) 745-2885



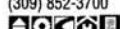
**Centennial Park/LeMont Dirt Burners**, 7827 Rohrer Dr., Downers Grove, IL 60516; Scott Moravik, (708) 968-6411



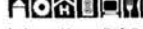
**Central Illinois Max Track**, 1013 Iowa St., Ashmore, IL 61912; Josh Carter, (217) 349-8824



**Diehard R/C Raceway**, 300 N. Main, Kewanee, IL 61443; Dick Jennings, (309) 852-3700



**Hobby Town Raceway**, 4611 W. Rt. 120, McHenry, IL 60050; Mike Hollingsworth, (815) 344-1777



**Leisure Hours R/C Raceway**, 24121 W. Theodore, Bldg. 1, Plainfield, IL 60544; Scott Hill, (815) 439-1777 (track), (815) 439-1477 (shop)



**Machesney Park**, 1220 Shappert Dr., Machesney Park, IL 61115; (815) 282-1311



**Marty's R/C Hobby**, 1335 E. Broadway, Bradley, IL 60915; Gail or Marty, (815) 933-8441



**Mitey Motor Speedway**, 1109 N. Bloomington St., Rte. 23, Streator, IL 61364; Doug, (815) 672-4212



**Monroe R/C Raceway**, 26049 Ridgeland Ave., Monroe, IL 60449; Roy or Roberta Moody, (708) 534-2422 (track), (708) 799-5597



**Peoria R/C Raceway**, 518 Hillsdale Ave., Peoria, IL 61604; Ray Tighe, (309) 672-1780



**R/C Workshop**, 3100 S.W. Adams St., Peoria, IL 61605; Al Kretz, (309) 673-4860



**Racing Time**, 6012 S. Archer, Chicago, IL 60632; Brad or Gino, (312) 767-0773



**Radio-Active Raceway**, 751 N. Bolingbrook Dr., #15, Bolingbrook, IL 60440; Jim, (708) 759-7557



**Redline Raceway**, 921 Harding, Calumet City, IL 60409; (708) 862-8181



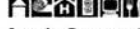
**Shiloh Eagles Superspeedway**, 308 N. Virginia Ave., Belleville, IL 62220; (618) 277-6030



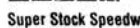
**SIRCAR Raceway**, 1200 N. Marion, Carbondale, IL 62901; (618) 549-5885



**Slot and Wing Hobbies "Race Place"**, 1615 W. Springfield, Champaign, IL 61821; (217) 359-1920



**Superior Raceway**, 1706 W. Bradley, Champaign, IL 61821; (217) 359-8073



**Super Stock Speedway**, 54 Bonnenstiehl Rd., Collinsville, IL 62234; Thomas Smith, (618) 632-2615



## INDIANA

**Autograph/Race World**, 231 Pendleton Ave., Pendleton, IN 46064; Sam Mudd, (317) 778-3386



**Blaze'n Race'n**, P.O. Box 6, Hamlet, IN 46532; James Berndt, (219) 867-1324



**Dave's ATVs, Hobbies & Raceway**, 3035 English Ave., Indianapolis, IN 46201; Dave Sutton, (317) 767-9641



**Elliott's R/C Raceway**, 2140 North Platte, Kokomo, IN 46901; (317) 452-0163



**Hobby Barn Raceway**, 1950 Springhill, Terre Haute, IN 47802-9694; (812) 299-5773



**K&L Hobbies & Raceway**, 3275 North 525W, LaPorte, IN 46350; (219) 324-0353



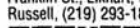
**Kokomo Hobby & Radio Raceway**, 1108 E. Markland, Kokomo, IN 46901; (317) 457-5060



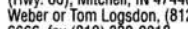
**Main Hobbies**, 625 Columbia, Lafayette, IN 47901; Randy Palmer, (317) 742-2045



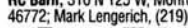
**Maple City Speedway**, 1651 W. Franklin St., Elkhart, IN 46516; Pete Russell, (219) 293-1827



**P&T Hobbies and Raceway**, RR 2 (Hwy. 60), Mitchell, IN 47446; Paul Weber or Tom Logsdon, (812) 849-6666, fax (812) 332-0018



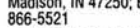
**RC Barn**, 310 N 125 W, Monroe, IN 46772; Mark Lengerich, (219) 692-6600



**R/C World of Indiana**, RR #2, Box 335, Lynn, IN 47355; (317) 874-2464



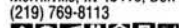
**Racer's Choice Raceway**, State Rd. 256, Jefferson Co. 4-H Fairgrounds, Madison, IN 47250; Eric Burns, (812) 866-5521



**Rimfire Raceway and Hobby Shop**, 8 Wood Ct., Hebron, IN 46341; Sandra Eaton, (219) 996-6288(shop), 987-2803(home)



**The Rink**, 7900 Whitcomb, Merrillville, IN 46410; Don Reiner, (219) 769-8113



## IOWA

**Dubuque R/C Speedway**, Dubuque County Fairgrounds, Dubuque, IA 52001; Paul Conlon, (319) 556-2736



**Hobby Haven**, 7672 Hickman Rd., Des Moines, IA 50322; Jim, (515) 276-8785



**M&M Racetrack**, 2434 Pilgrim Path, Oskaloosa, IA 52577; (515) 673-6265



**Manly R/C Club**, Box 23 (Hwy 65), Manly, IA 50456; Bruce Hill, (515) 454-2025



**Mr. Car Raceway**, P.O. Box 1112, Central Iowa Fairgrounds, Marshalltown, IA 50158; Jim Gossett, (515) 483-2234



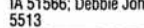
**Radio Control Raceway Park**, 746 South 30th St., Fort Dodge, IA 50501; Bernie Halverson, (515) 576-3780



**Sibley Raceway**, Osceola County Fairgrounds, Sibley, IA 51249; Allen Reck, (712) 754-2604



**Southwest Iowa Hobbies 'n' R/C Raceway**, 204 S. Broadway, Red Oak, IA 51566; Debbie Johnson, (712) 623-5513



## KANSAS

**Dave's Hobbies & Things**, RR2, Box 150, Cherryvale, KS 67355; David Carey, (316) 336-3683



**M&M R/C Superspeedway**, 2400 Broadway, Parsons, KS 67357; Mark and Melissa Brown, (316) 421-6742 or (316) 421-5006



**R/C Superdrome & TQ Pro Shop**, 14 E. Ave "A", Hutchinson, KS 67501; Joe Jandrakovic, (313) 665-6633



**R/C World Raceway**, 217 Brownie Ave., Scranton, KS 66537; Corky or Pam Green, (913) 793-2313



**RCRC Raceway**, 507 N. 4th, Atwood, KS 67730; Bob Dunker, (913) 626-3261

**Shawnee Hobby & R/C Raceway**, 4603 Shawnee Dr., Kansas City, KS 66106; Bill Pugh, (913) 384-3211



## KENTUCKY

**Bluegrass Int'l/Perry's R/C Hobbies**, 214 Globe St., Radcliff, KY 40160; William Perry, (502) 351-RACE



**Checkered Flag Raceway**, 1790 Bryan Station Rd., Lexington, KY 40505; Billy or Jay, (606) 293-6825



**ProTrak R/C Racing**, 3451 Cane Run Rd., Louisville, KY 40211; Tony Hardin, (502) 778-2657

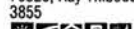


**West Kentucky R/C Hobbies**, 45 Hawkins Loop, P.O. Box 21, Symsonia, KY 42082; (502) 851-3534



## LOUISIANA

**Cajun R/C Raceway**, Rt. 2, Box 288 (Hwy. 343, Bosco) Church Point, LA 70025; Ray Thibodeaux, (318) 873-3855



**Indy Speedway & Hobby**, 3753 General Degaville dr., New Orleans, LA 70131; Vince Sheetz, (504) 367-1891



**Pontchartrain Hobby Shop**, 3755 Pontchartrain Dr., Slidell, LA 70458; (504) 649-1199



**Red Dirt Raceway & Hobbies**, 324 Pitkin Rd., Leesville, LA 71446; C.J. Hall, (318) 535-9238

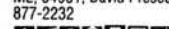


**T&M Pro Hobbies**, 9212 W. Judge Perez Dr., Chalmette, LA 70043; Tom/Melodie Barthel, (504) 271-3111

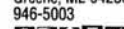


## MAINE

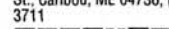
**Central Maine R/C Speedway and Hobbies**, 18 Lithgow St., Winslow, ME, 04901; David Prescott, (207) 877-2232



**Clay Bowl R/C Hobbies**, P.O. Box 61, Greene, ME 04236; Pat Cap, (207) 946-5003



**Mementos Hobby Shop**, 86 Sweden St., Caribou, ME 04736; (207) 498-3711



## MARYLAND

**Cockeysville Astrodome Racers**, 10854 York Rd. (rear), Cockeysville, MD 21030; Steve Balaz, (410) 666-2521



**J.R.'s Race Place**, 3649 Gelston Dr., Balto, MD 21229; James Radford, (410) 947-2766



**The Track**, 16806 Oakmont Ave., Gaithersburg, MD 20877; Mimi Wong, (301) 417-9630



**Woffland Hobbies and Raceway**, 2072 Crain Hwy., Waldorf, MD 20601; Perry Pritchard, (301) 870-0293






# PRO-LINE TRACK DIRECTORY

**Capital Area Racing Society**, The Plumbers Hall, 5405 S. Logan, Lansing, MI; Dave Halsey or Brad Smith, (517) 646-8224 or (517) 484-4028  


**Can-Am Hobbies Speedway Park**, 1152 Gratiot, Marysville, MI 48040; Don Grinde, (313) 364-3338  


**Chatter Box Racing**, P.O. Box 164, Old State Rd., Central Lake, MI 49622; Bill Altermatt, (616) 544-9829  


**Doug's Dirtway**, 5210 Colby Rd., Owosso, MI 48867; Doug Conn, (517) 723-3368  


**JJ's R/C Speedshop**, 5713 13 Mile Rd. (corner of 13 and Mound), Warren, MI 48092; (810) 977-0420; fax (810) 977-7290  


**Ludington R/C Raceway**, 1483 N. Dennis Rd., Ludington, MI 49431; (616) 843-4654  


**MCRC Raceway**, 4601 Page Ave., Michigan Center, MI 49023; Sam Sprang, (517) 787-9161  


**Newberry R/C Raceway**, RR 3 Box 2860, McMillan, MI 49853; Dustin Hart, (906) 293-3044  


**Pointe R/C**, 2119 Summerton Rd., Mt. Pleasant, MI 48858; (517) 773-5711  



**R&L Hobbies**, 9782 Portage Rd., Kalamazoo, MI 49002; Rex Simpson, (616) 323-3686; fax (616) 329-1744  



**Rainbow Gardens**, 600 North Shore Ave., Crystal, MI 48818; Mike or Sandy, (517) 235-4298  


**Rider's Super Speedway**, 42040 Kopperwick Rd., Canton, MI 48187; Brent Martin, (313) 981-8700 or (313) 451-5599  


**Scale Racing Center**, 3432 Highland Rd., Waterford, MI 48328; Larry Rossi, (810) 683-5529  


**T/A Raceway**, 119 N. Michigan, Big Rapids, MI 49307; Harvey, (616) 796-3217  



**Vicksburg Off-Road R/C Raceway**, 50201 Silver St., Vicksburg, MI 49097; Jeff Schroeder, (616) 375-8591  


**Village Hobbies-n-Crafts**, 195 N. Elm, Hesperia, MI 49421; Alan or Fran, (616) 854-1374  



**Westside R/C Raceway**, 4335 Lake Michigan Dr., Grand Rapids, MI 49504; George Orlikowski, (616) 791-9902. (Open May through August)  


## MINNESOTA

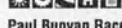
**Badger R/C Raceway**, 404 Tamarack St., Box 101, Badger, MN 56714; Keith Cumming, (218) 386-2001  


**C/S Speedway**, 312 N. Bdwy, Crookston, MN 56716; Caesar Kaiser, (218) 281-6665  


**Grand Rapids R/C Speedway**, 2209 Hwy 2 East, Grand Rapids, MN 55744; Aaron Vogen, (218) 326-6751  


**Greater Minnesota Racin' Place**, 3302 Southway Dr., St. Cloud, MN 56301; Jon Jackson, (612) 252-9768  



**Larry's Raceway Park**, 105 3rd Ave. NE, Glenwood, MN 56334; Dan Winter, (612) 634-5246  



**Minn-E-Golf & Hobby**, 9100 Park Ave., Elk River, MN 55330; (612) 441-8365  


**Paul Bunyan Raceway**, Rte. 1, Box 468, Bemidji, MN 56664; Brad Trask, (218) 243-2749  


**Range Racing World R/C Speedway**, 412 Jones St., Eveleth, MN 55734; Bill, (218) 744-4423  



**Southside Speedway**, 2241 Marion Rd. SE, Rochester, MN 55904; Kevin Guy, (507) 281-3233  


**Trackside Racing**, 2300 Myrtle Ave., St. Paul, MN 55114; Winton Otelie, (612) 644-3424  



**Wild West R/C Speedway**, 2822 Piedmont Ave., Duluth, MN 55811; Roger Delosch, (218) 727-6248  



## MISSISSIPPI

**Crossroads Raceway**, 904 Cass St., Corinth, MS 38838; Ronnie Inman, (601) 287-7169  


**Fast Freddy's Raceway**, 20390 Hwy. 49, Saucier, MS 39574; Mark Payne, (601) 832-0315  


**Joe McFadden Hobbies**, 1619 51st Ave., Meridian, MS 39307; Joe McFadden, (601) 483-7000  



**Rural Hill Raceway**, 2535 Tabernacle Rd., Columbus, MS 39702; Jeffrey Alvey, (601) 328-9429  


**Small Cars Unlimited**, 820 Cooper Rd., Jackson, MS 39212; (601) 372-FAST  


**Wheeler R/C Raceway**, Rt. 4, Box 5694, Booneville, MS 38829; Doug Holt, (601) 365-3439 or (601) 842-5275  


## MISSOURI

**All Seasons Hobby**, 152 O'Fallon Plaza, O'Fallon, MO 63366; Bob Daniels, (314) 281-8767  


**ARC Raceway**, 109 South High St., Jackson, MO 63755; Burt, (314) 243-1371  



**B&L Hobbies & Raceway**, 2800 Anchor Dr., Park Hills, MO 63061; Bob Marler, (314) 431-9444  



**Blue Vue Speedway**, 12019 E. 47th St., Kansas City, MO 64133; Mark Randol, (816) 358-0238  


**Columbia R/C Trax**, 1502 W. Bus Loop 70 (Exit 125), Columbia, MO 65202; Gary Phillippe, (314) 682-3993  



**Extreme Edge Speedway**, 119 W. Liberty St., Farmington, MO 63640; Ken Boren, (314) 756-4122  


**Fast Trax Racing Assoc.**, mailing: 206 N. Water, Nixa, MO 65714; track: 318 Boonville, Springfield, MO 65082; Juan Montell, (417) 725-4337  


**K.C. R/C Speedway**, 11426 N. Walnut, Kansas City, MO 64155; Justin Baugh, (816) 436-3638  



**Lafayette Riverside Raceway**, P.O. Box 9663, Marshall Rd., Kirkwood, MO 63122; Don Laningham, (314) 966-8912  


**Mid-Mo R/C Raceway**, 400 W. 2nd, Sedalia, MO 65301; (816) 826-5113  


**Ozark's R/C Raceway**, Hwy 13, Brighton, MO 65781; Gene Rhodes (417) 742-4376 or Ron Hawkins, P.O. Box 460, Willard, MO 65781, (417) 742-2561  


**Suppenbach Winter Racing**, Route 5, Box 66, Pleasant Hill, MO 64080; Larry Suppenbach, (816) 987-5828  


## MONTANA

**Bozeman R/C Powerhouse Track**, 2825 W. Main (west side of Main Mall), Bozeman, MT 59715; (406) 586-0071  



**Garden City R/C Raceway**, 11885 1/2 Highway 93, Lolo, MT 59847; Doug Phillips, (406) 549-3891 or (406) 728-8029  


**Stormer Raceway & Slot Motorplex**, P.O. Box 126 Hwy 2 East, Glasgow, MT 59230; (406) 228-4569  


## NEBRASKA

**Mr. Bill's**, 450 West 2nd St., Hastings, NE 68901; Bill J. Ries, (402) 462-4865  



**River City Racing**, Aksarben Field, Sales Pavilion, Omaha, NE 68164; Robert Conner, (402) 431-0482  


**The Salvation Army**, 4032 Harrison St., Omaha, NE 68147-1012; Lt. Michael Delashmit, (402) 634-3414  


**Wild Card Raceway**, RR1 Box 137, Columbus, NE 68601; Roger F. Miller, (402) 564-7743  


## NEVADA

**Radio Controlled Race World**, 905 So. Rock Blvd., Sparks, NV 89431; James or Barbara Balough, (702) 356-2882  


**Silverbow Speedway**, 7274 Hardtack Cir., Las Vegas, NV 89119; Mike, (702) 896-3577  



## NEW HAMPSHIRE

**Economy R/C Speedway**, 4 Maple St., Winchester, NH 03470; Harold Thomas, (603) 239-4482 or 239-6470  


**Fastracker Club**, 520 Washington St., Keene, NH 03431; Bill Phillips or John O'Connor, (603) 352-0811 or 357-8393  



**Hobby Etc.**, Heritage Place, Rt. 101A, Amherst, NH 03031; (603) 595-8549  


**Lake Region R/C Speedway**, Lily Pond Rd., Laconia, NH 03246; Louie Blais, (603) 524-2909  



**Robert's Railroad & Hobbies**, Box 431, Rt. 4 at Rt. 152, Northwood, NH 03261; Robert Jeffers, (603) 942-5193  



## NEW JERSEY


**Bob's American Raceway**, 142 Wilson Ave., Englishtown, NJ 07726; Bob Morrisco, (908) 446-3737  


**Family Hobbies Raceway**, 3576 N.W. Blvd. & Weymouth Rd., Vineland, NJ 08360; Linda Vogel, (609) 696-5790  


**Golden Hobbies & Crafts**, 415 Erial Rd., Pine Hill, NJ 08021; (609) 782-1222  



**Hobby Shop Speedway**, 23 State Hwy NJ 08822; Patrick Clark or Eric Lee, (908) 806-7244 or (609) 737-1224  


**Jefferson Speedway**, 5494 Berkshire Valley Rd., Oak Ridge, NJ 07438; (201) 697-7525  


**LBRA Track**, 392 Warburton Pl., Long Branch, NJ 07740; (908) 222-5122  


**Phil's Truck and Track R/C Shop**, 2063 South Rte. 130, Florence, NJ 08518; Phillip Husenitz, (609) 499-0002  


**Pit Stop Dragway**, Campus Rd., Totowa, NJ 07512; Kimberly Frank, (201) 956-RACE (7223)  



**The Race Place**, 1151 Hwy. 33, Farmingdale, NJ 07731; John Fary, (908) 938-5215  


**Spennell Speedway**, 2301 Rte. 9 North, Great American Flea Market, Howell, NJ 07731; Mitch, (908) 577-9191  


**On Trax Hobbies**, 1549 Rte. 70, Browns Mills, NJ 08015; Joseph DiGirolamo, (609) 735-0422  



**Zeppelin Hobbies**, 92 Rt. 23N, Riverdale, NJ 07457; Lou Ballini, (201) 831-7717  



## NEW MEXICO

**Las Cruces R/C**, 3110 Hillsdale, Las Cruces, NM 88005; Bob Risner, (505) 523-1962  


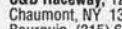
**Meerscheidt R/C Raceway Park**, Walnut and Hadley, Meerscheidt Park, Las Cruces, NM 88001; Wayne Ward, 2230 Coleen Ct., (505) 523-4883, (505) 326-1758  


## NEW YORK

**Beach Hill Speedway**, 1760 Beach Hill Rd., Watkins Glen, NY 14891; Jim Riley, (607) 535-2616  


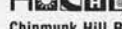
**Brockport Speedway**, 6000 Sweden Walker Rd., Brockport, NY 14420; Gil & Betty Glidden, (716) 637-6224  


**Brownie's Pro & Sport Hobbies**, 124 Bennett St., Staten Island, NY 10302-1426; John Brown, (718) 727-2194  



**C&D Raceway**, 12542 NYS Rte. 12E, Chaumont, NY 13622; Chris or Don Bourquin, (315) 649-5403  



**Capital District R/C Racers**, 27 Venus Dr., Albany, NY 12205; Keith Green, (518) 783-7859  


**Central New York R/C Auto Racers**, Martin St., P.O. Box 116, Rome, NY 13440; John Orr, (315) 336-5140  



**Chipmunk Hill R/C Speedway**, 217 Pine St., Theresa, NY 13691; Ted or Pete House, (315) 628-5065  


**Competition Hobby Supplies**, 1006 Loudon Rd., Rte. 9, Latham, NY; (518) 786-3622  


**East Coast Barn Stormers**, MD #1 Old Oxford Rd., Chester, NY 10918; Michael or Lou, (914) 469-8206  


**East End Off-Roaders**, 7335 Main Rd., Mattituck, NY 11952; Wally, (516) 298-2020  


**Hal's Hobby Shop**, 120 Cayuga St., Fulton, NY 13069; Hal & April Halstead, (315) 598-2772  


**Jerry's Raceway**, 111 S. Applegate Rd., Ithaca, NY 14850; Jerry and Lori Achilles, (607) 277-0940  


**LI 1/4-Scale Racers**, 63 Horton Dr., Huntington Station, NY 11746; (516) 351-5384  


**The Model Shop**, 11 Lakewood Ave., Monticello, NY 12701; Richard Cimino, (914) 791-6075  

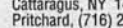

**National Hobby Supply**, 25 1/2 Webb Rd., Middletown, NY 10940; Bruce Roosa, (914) 342-6786  


**1/4 Raceway and Hobbies**, 168 Broad Hollow, Farmingdale, NY 11735; George or Dora, (516) 845-7223  


**Performance Hobbies Raceway**, 205 North Ave., Webster, NY 14580; Anthony Cenzi, (716) 621-1274  


**Performance Plus Radio Control Speedway/The Hobby House**, 1141 1/2 Jones & Gifford Ave., Jamestown, NY 14701; (716) 488-1772  



**Peter's R/C Raceway**, Rte. 36, Leicester, NY 14481; P. Gerald Scorsone, (716) 382-3126  

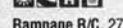

**P.R.O. Speedway**, 5 Washington St., Cattaraugus, NY 14719; Marc Pritchard, (716) 257-3101  


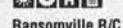
**R/C Competition Corner**, K-Mart Plaza, Mattdale, NY 13211; (315) 455-8718  


**R/C Hobbies**, Rt. 49, Box 138, Constantia, NY 13044; Roy Catholdi, (315) 623-9536  


**R/C World**, 69-57 Juniper Blvd. S., Queens, NY 11379; Norm, (718) 326-0002  


**R&S Hobbies**, 356 Macedon Ct. Rd., Fairport, NY 14502; (716) 425-3722  


**Rampage R/C**, 27 Fuller Ln., Hyde Park, NY; Brian Walker, (914) 229-2456  


**Ransomville R/C Raceway**, 2576 Academy St., Ransomville, NY 14131; Irene Preisch, (716) 791-8310  


## KEY TO SYMBOLS

-  Indoor
-  Outdoor
-  Off-road
-  Oval
-  Dirt oval
-  Carpet
-

Schoharie Co. R/C Car Club, P.O. Box 126, Cobleskill, NY 12043; (518) 234-4600



Small Torque Racers of Long Island, 24 Horton Dr., Huntington Station, NY 11746; George Franz, (516) 271-1119



Speedworld R/C Raceway, Rte. 12, Chenango Forks, NY 13746; Mike Magnusson, (607) 648-2063



South Shore Hobby & Raceway, W. Roe Blvd., Patchogue, NY 11772; Don Hauck, (516) 758-5567



Transit Speedway & Hobbies, 5319 Transit Rd., Depew, NY 14043; (716) 684-7368



Ulster County Speedway, P.O. Box 71, New Paltz, NY 12561; Joe Colombo Jr., (914) 754-7664



Valley Hobbie Inc., 2714 Main Ave., Fargo, ND 58103; Craig or Keith, (800) 493-9971



Westfield R.C. Speedway, 27 Clark St., Westfield, NY 14787; John or Jared Lindstrom, (716) 326-2339



Walt's Hobby, 2 Dwight Park Dr., Syracuse, NY 13209; (315) 453-2291

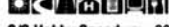


#### NORTH CAROLINA

The Antique Barn, 2810 Forest Hills Rd., Wilson, NC 27893; Steve Limsalot, (919) 237-6778



Badin Shore Raceway, 1730 Jackson Lake Rd., High Point, NC 27263; Jimmy or Tim Martin, (910) 431-6407



C/C Hobby Speedway, 8358 U.S. Hwy. 220 Bus. N., Randleman, NC 27317; Steve & Mary Cox, (910) 495-3482



C&H Raceway, 1400 N. Cannon Blvd., Kannapolis, NC 28083; Camera & Hobby Shop, (704) 933-5321



Cape Fear Speedway, 207 Harley Rd., Wilmington, NC 28401; Bob Justice, (919) 762-1184



Carolina Dragway, 907-D Warsaw Rd., Clinton, NC 28328; (910) 592-4569



Carolina Hobbies R/C Raceway, Route 1, Box 158, Taylorsville, NC 28681; Kim & Roseanne Kulawik, (704) 495-4040



Clapp's R/C Motor Speedway, Rt. 4, Box 300A, Siler City, NC 27344; Al Clapp, (919) 663-3198



Clinton R/C Raceway, 907-C Warsaw Rd., Clinton, NC 28328; Corbitt Marshburn (919) 592-9489



Hobbies, Etc., 5540 Atlantic Springs, Raleigh, NC 27604; Don Asplen, (919) 790-1444



Hobby Park Dragway, W. Clemmons Rd., Winston-Salem, NC; Jack Wright, (919) 983-9416



Hobby Park, W. Clemmons Rd., Winston-Salem, NC 27103; Dick Butler, Parks & Recreation, (919) 727-2063



Motorlead R/C Raceway, 125 Park St., Canton, NC 28716; (704) 648-7911



Ride & Slide R/C Raceway, 5319 Yadin Rd., Fayetteville, NC 28303; Jim Woodman (910) 425-5276 or Bill Culbertson (910) 867-4202



Rosewood Speedway, Rt. 5, Box 853, Goldsboro, NC 27530; Glenn Elam, (919) 731-4734



S&B Speedway & Hobbies, Rt. 1, Box 311A, Farmville, NC 27828; Ricky Strickland, (919) 753-4422



Sandhills Raceway Inc., US #1 South, Aberdeen, NC 28315; (919) 944-7414



Winston R/C Drag Series, W. Clemmons Rd., Winston-Salem, NC 27106; Jack Wright, (910) 922-3800



#### NORTH DAKOTA

Hacienda Hills Speedway, 20 Hacienda Hills, Minot, ND 58701; Kenny Duchscherer, (701) 839-4419



Northern Mini Racers, P.O. Box 415, Minot, ND 58702; Roger Lee, (701) 839-5294



Surrey International Raceway, RR 1, Box 37, Norwich, ND 58768; Marlen Lenton, (701) 728-6760



Valley Hobbie Inc., 2714 Main Ave., Fargo, ND 58103; Craig or Keith, (800) 493-9971



#### OHIO

Aerotech Raceway, 409 Applegrove Rd., North Canton, OH 44720; (216) 499-1300



Bryan Thunderdome, Townline Rd., Bryan, OH 43506; Brent Pfund, (419) 924-2911



C/R Hobbies and Raceway, 323 Center St., Ashtabula, OH 44004; Virginia Gagat, (216) 992-3833



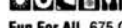
D&J R/C Raceway, 801 W. Market St., Orrville, OH 44667; Don Yoder or Mark Nussbaum, (216) 682-4266



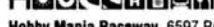
D&S Hobbies Raceway, 7701 Crile Rd., Concord, OH 44077; (216) 354-2112



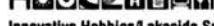
Flag City Raceway, 3772 C.R. 18, Findlay, OH 45840; Ruth Hubbard, (419) 422-5589



Fun For All, 675 College Dr., Batavia, OH 45103; Dan England/Steve Smith (513) 732-0440



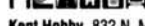
Hobby Mania Raceway, 6597 Route 224, Lowellville, OH 44436; (216) 536-8282



Innovative Hobbies/Lakeside Speedway, 3427 Manchester Rd., Akron, OH 44319; (216) 645-1333



JB Hobby & Raceway, 8760 St. Rt. 201, Tipp City, OH 45371; Bob Curtis, (513) 845-8222



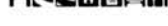
Kent Hobby, 832 N. Mantua St., Kent, OH 44240; Bob Sabo, (216) 673-0422



Lafferty R/C Raceway, Box 153, 70228 Hurrah St., Lafferty, OH 43951; Chris Christman, (614) 968-4818



Lewisburg R/C Raceway, 395 US Rt 40E, Lewisburg, OH 45338; Bob Harting, (513) 678-8404 or (614) 889-0876



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## RACING TO BRING YOU THE BEST!

# PRO-LINE

## Get Hooked...On the Ultimate Traction!



Pro-Line's new M2 Team Compound release is super-soft for that extra traction in the toughest of conditions. Pro-Line is the current NORRCA Truck World Champion in gas and electric.

### New M2 Part Numbers (Team Compound) with foam inserts

Stock #	Description
8083M2	Pro-83 M2 "Flat Fuzzie" 2.15" 2WD or 4WD buggyrears, super-soft XTR-M2 compound
8088M2	Pro-88 M2 "Flat 80s" Mini-Pin 2.15" 2WD or 4WD buggy rears, super-soft XTR-M2 compound
8090M2	Pro-90 M2 "Originals" Mini-Pin 2.2" truck rears, super-soft XTR-M2 compound
8092M2	Pro-92 M2 "Fuzzie T" 2.2" truck rears, super-soft XTR-M2 compound
8096M2	Pro-96 "Stubbie T" 2.2" truck rears, super-soft XTR-M2 compound

F1 Haws will convert your Tamiya F1 kit into the ultimate parking lot machine! Use Pro-Line's new front (#2587) and rear (#2588) semi-pneumatic tire conversion wheels with front F1 Haws (#1068) and rear F1 Haws (#1069).



### New Pro-Line Part Numbers (Hawg Heaven!)

Stock #	Description
1066	AC-66 XTR-M2 Sedan Haws fits narrow Tamiyatouring sedan wheels
1068	AC-68 Front F1 Haws (semi-pneumatic) fits Pro-Line wheel #2587
1069	AC-69 Rear F1 Haws (semi-pneumatic) fits Pro-Line wheel #2588



PROTOform

Check out the hottest race-winning bodies around. Protoform is the current IFMAR World Champion.

### New PROTOform Part Numbers (Hot Race Bodies!)

Stock #	Description
1208	'95 Grand Prix SS (regular or lightweight)
1209	'95 Monte Carlo SS (regular or lightweight)
1211	'95 Chevy Supertruck narrow (regular or lightweight)
1403	F1 Type M P4/9 fits HPI and Tamiya F1 kits (regular weight)
1404	F1 Type B B-195 fits HPI and Tamiya F1 kits (regular weight)
1405	Saturn SC2 Touring Sedan fits YR-4 and Tamiya F1 kits (regular weight)
1509	'95 RAMbunctious "ET" fits the electric RC10T & RC10T2

PROTOform

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## Pro-Line/JACO Helpful hints for 1995!

### Parking Lot Hint #3

One of the most commonly asked questions we receive is, "Which tire traction compound should I use?" Since there are numerous compounds available that perform well under a variety of conditions, we cannot recommend one particular compound. There are some guidelines, however, that should be followed when using tire traction additives. First, try what seems to be working at your particular track. Look at what the fast guys are running and how they apply the additives. How much do they put on? How long do they let it sit before they wipe it off? Do they treat all tires with the same amount of compound? Second, don't use too much traction compound or let it sit

too long on the tire, because it may make the tire too soft or damage the glue joints. Carefully read the directions on the container. Many of these products are flammable, so be careful.



Mounted and trued F1 tire.

### Racing Hint #3

Have you ever seen someone buy a brand new set of tires to race, only to grind them down to nothing on a tire truer? Well, believe it or not, there are some good reasons to true your tires down to race. A smaller tire means lower rotating mass, less sidewall flex and better acceleration. In our experience, a tire will "search" out its optimum diameter. For example, this means that a 2.5-inch-diameter tire may wear very rapidly until it reaches say 2.25 inches. At this point, tire wear decreases dramatically as the tire has found its optimum operational diameter. Your car is now operating at peak efficiency, and the handling becomes more stable and consistent. By truing the tires down to a smaller diameter before you race, you eliminate having to wear the tires down by abrasion alone.



On-Road performance mounted and trued foam tires.

Remember to change your gearing to compensate for the smaller tire size. Of course, truing your tires down shortens the life of the tire. This is why we recommend running tires at full diameter, unless you are competing under racing conditions.

Until next time—Good Luck!



**Racing to bring  
you the best!**

P.O. Box 456, Beaumont, CA 92223;  
(909) 849-9781; fax (909) 849-2968

Medina R/C Raceway, 754 N. Court St., Medina, OH 44226; Bill Ahoit, (216) 723-0255



Mr. T's R/C Super Speedway, 5540 CR 16, Wauseon, OH 43567; Nick Tinsler, (419) 335-3196



Performance R/C Club of Ohio, 2206 13th St. NE, Canton, OH 44705; Greg Ledbetter, (216) 453-7089



Scotlers Hobby Hut, 234 Robbins Ave. #D, Niles, OH 44446; Dave "Scooter" Evans, (216) 544-9411



Steel Valley Hobbies & Raceway, 157 N. 4th St., Steubenville, OH 43952; William Northrop, (614) 282-3003



T.A.R.C.A.R., 632 Eckle Rd., Perrysburg, OH 43551; Bill Bridges, (419) 826-3859 or Dave Scanes, (419) 893-1916



Y-City Hobby & Speedway, 120 S. 6th St., Zanesville, OH 43701; Kevin McKenna, (614) 455-3025



### OKLAHOMA

Adams Creek R/C Speedway, 5207 S. 194th E. Ave., Broken Arrow, OK 74014; John Beighle, (918) 355-1416



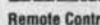
Competition R/C, 180 SE 89th, Oklahoma City, OK 73149; James or Louise Brown, (405) 634-0809



Coweta Hobby & Speedway, 310 S. Broadway, Coweta, OK 74429; Derial Seabolt, (918) 486-3948



Off-Road Car Assoc. of Tulsa, 9720 Swan Dr., Broken Arrow, OK 74014; George Gooch, (918) 486-4528



Remote Control Race Course, 400 S. Vermont Ave., Suite 104, Oklahoma City, OK 73108; Rick or Steve, (405) 947-RAEC



Wild Country Speedway, 127 South Main, Porter, OK 74454; Charles McCollough, (918) 685-0372 or (918) 687-1686



### OREGON

Cathie's R.C. World 443 So. Calapooia, Sutherlin, OR 97479; Wes/Cathie Buzzard, (503) 459-2746



Competition Racing Assoc., 17941 NE Glisan, Portland, OR 97230; Mark Taylor, (503) 257-0796



Junior Vehicle Speedways, 3090 Starwood Ct., Medford, OR 97501; (503) 779-3090



North Lawrence Raceway, 36 N. Lawrence, Eugene, OR 97401; Gary Hill, (503) 484-9857



Pit Stop Hobby, 634 N. Coast Hwy., Newport, OR 97365; Richard Wood, (503) 265-2825



R/C Plus Hobbies Raceway, 2029 25th St. SE, Salem, OR 97302-1130; Ron Smith, (503) 364-9188



R/C Speed Center, 2810 N. Pacific Hwy., Medford, OR 97501; (503) 779-8298



Yamhill County R/C Car Club, 722 Morgan Ln., McMinnville, OR 97128; Larry Rucker, (503) 472-7234



### PENNSYLVANIA

A&D's Bumps & Jumps, RR7, Box 7395C, Stroudsburg, PA 18360; Dan Ambrosio, (717) 424-1750



Benders Junction Speedway, 2300 Benders Dr., Bath, PA 18014; Gerald Wambold Jr., (610) 759-0161



Brookville Hobby Shop, 170 Main St., Brookville, PA 15825; Mark Tonell, (814) 849-7385



CEB Motors R/C Div., 5743 Molly Pitcher Hwy., Marion, PA 17235; Charlie Boozie, (717) 375-4635



Clearfield R/C Car Club, P.O. Box 297, Clark Hill Rd., Hyde, PA 16843; Joe Welch, (814) 765-3045



Clearfield R/C Raceway, 4 Capricorn Ct., Clearfield, PA 16830; Shawn Richards, (814) 765-5608



Cressona Mall Speedway, Rt. 61, Pottsville, PA 17901; (717) 385-3506



DC Ultra Trax, 13 York Rd., Wycombe, PA 18974; David Cowan, (215) 672-5200



Dreamboat Hobbies, 2810 Pennsylvania Ave. W., Warren, PA 16365; Louie Dussia, (814) 723-8052



East St. Raceway, 736 E. Railroad Ave., Verona, PA 15147; (412) 826-0602



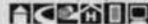
Henning Scale Models R/C Raceway, 128 S. Line St., Lansdale, PA 19446; Bill Henning, (215) 362-2442



Hipkins Hobbies Raceway, 402 W. Avondale-New London, West Grove, PA 19390; Doug Hipkins, (215) 869-8585



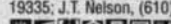
Hobbies & Stuff, 116 West Apple St., Connellsville, PA 15425; Mark Schomer, (412) 628-0228



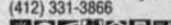
Hobby America Raceway, 5 Fitzsimmons St., Duke Center, PA 16729; Dan or Mike Coast, (814) 966-3765



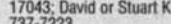
Hobby House Raceway, Downingtown Marketplace, Downingtown, PA 19335; J.T. Nelson, (610) 269-1300



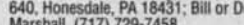
Koontz's Home & Hobby Center, 1205 Hoover St., Pittsburgh, PA 15204; (412) 331-3866



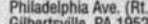
Kranzel's R/C Raceway & Hobbies, 415-B Bosler Ave., Lemoyne, PA 17043; David or Stuart Kranzel, (717) 737-7223



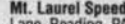
Marshall's R/C Raceway, RR 4, Box 640, Honesdale, PA 18431; Bill or Dot Marshall, (717) 729-7458



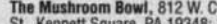
Modellbahn Ott Hobbies, 1145 E. Philadelphia Ave. (Rt. 73), Gilbertsville, PA 19525; (215) 367-5925



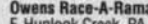
Mt. Laurel Speedway, 835-8 Hiester Lane, Reading, PA 19605; Joe Vaccaro, (215) 921-0176



The Mushroom Bowl, 812 W. Cypress St., Kennett Square, PA 19348; Joe Bruce, or Drew, (610) 444-1850



Owens Race-A-Rama, RR 2, Box 98 F, Hunlock Creek, PA 18621; Rany Owens, (717) 477-3220



Pinion Twisters, 3M Plant, Green Ln. and Mitchell, Bristol, PA; John (215) 632-9744, Bob (215) 945-0325



Pro Challenge Raceways, Wycombe Ave. (P.O. Box 536), Lansdowne, PA 19050; Bob Paulavage and Don Fewkes, (610) 622-7651



Prop & Wheels Raceway, 139 W. Broad St., Tamaqua, PA 18252; Gil Walters, Prop & Wheels Hobbies, (717) 668-2288



R/C Pro Speedway, Millville Rd., Bloomsburg, PA 17815; Norm Swisher, (717) 387-0266



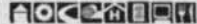
RCO Raceway 519 Broadway, Hanover, PA 17331; Chris Shaffer, (717) 633-9490



Riverside Raceway, PA Ave. W & Hickory, Warren, PA 16365; Jeff, (814) 723-4211



Road Runner Raceway, 1027 E. 7th St., Bloomsburg, PA 17815; John, (717) 784-1260



S.A. Hi Banks, Hahn's Dairy Rd., Palmyra, PA 18071; Scott Andrews, (610) 377-6123



Sinking Spring Race Center, 237 South Hill St., Sinking Spring, PA 19608; Randy Gelsinger, (610) 670-0760



South Mountain R/C Speedway, 357 Furnace Rd., Wernersville, PA 19565; George Merkel, (215) 267-4736



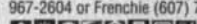
Staub Bros. R/C Speedway, 31 Locust St., Gettysburg, PA 17325; Todd or Scott Staub, (717) 334-5445



TC's R/Cs, 1537 Freeport Rd., Natrona Heights, PA 15065; Tom Coriale, (412) 226-8802



T-N-T Raceway, Randolph Rd., Great Bend, PA 18821; Ed Kraft, Rd. 1 Box 199C, Hallstead, PA 18821, (717) 967-2604 or Frenchie (607) 775-1766



Wagonhill Hobbies, 967 New Castle Rd., Rt. 422, Butler, PA 16001; Jeff Hyatt, (412) 865-9877



### PUERTO RICO

Hacienda Muñoz R/C Track, Carr. #14, Juana Diaz, PR 00795; (809) 837-7083



### RHODE ISLAND

Tri-State R/C Raceway, 205 Hallene Rd., Warwick, RI 02886; Raymond Dean, (401) 738-4908



### SOUTH CAROLINA

Bandit's Performance R/C Hobbies, 2037 S. Main St., Darlington, SC 29532; Bryan Howie Jr., (803) 393-3333



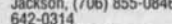
Coastal R/C Speedway, 8553 Hwy. 544, Myrtle Beach, SC 29577; Wendel Smith, (803) 236-9309



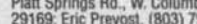
Hobbies and More, 1570 S. Main St., Darlington, SC 29532; Jerry Pollard, (803) 393-0355



ORA Atomic Racing Facility, 373 Boyd Pond Rd., Aiken, SC 29803; Bill Jackson, (706) 855-0846 or (803) 642-0314



R/C Speed Shop & Raceway, 2122 Platt Springs Rd., W. Columbia, SC 29169; Eric Prevost, (803) 791-4715



# PRO LINE TRACK DIRECTORY

**Racer's Choice Remote Control**, 4014 Fernand Rd., Piney Grove Shopping Center., Columbia, SC 29212; Clifford McLinden, (803) 561-0000



## SOUTH DAKOTA

**Dakota Off-Road Racers**, 2989 W. Br. Co. 12, Aberdeen, SD 57401; (605) 226-0604



## TENNESSEE

**Action Hobby Shop**, 3723 S. Mendenhall, Memphis, TN 38115; Brian Stricklin or Justin Austein, (901) 365-2620



**Cumberland Valley Raceway**, P.O. Box 233, Ashland City, TN 30715; Jamie Pate, (615) 792-4371, ext. 1195



**D&M's Downtown Raceway**, 2703 US Hwy. 411S, Maryville, TN 37033; (615) 681-8919



**Machine-Head Straits**, 938 Grandmere Rd., Lawrenceburg, TN 38464; Larry and Eliane Sanders, (615) 762-6630



**MSA R/C Racing**, Rt. 12 Box 489 B, Crossville, TN 38555; D.R. Findley, (615) 456-0027



**Robertson's R/C Raceway**, 175 Seavers Rd., Jackson, TN 38301; Travis Robertson, (901) 424-6423



**Sparta Raceway Park**, 32 N. Main St., Sparta, TN 38583; Carl (Buddy) Elrod, Rt. 5 Box #652, Sparta, TN 38583; (615) 836-8450 or (615) 761-3407



**Tri-County R/C Raceway**, 919 Little Dogwood, 1312 Kingston Hwy., Kingston, TN 37763; Dwaine Romine, Kyle Romine, (615) 376-2330, 376-9955



## TEXAS

**AA Raceway**, 1617 Foomey Rd., Austin, TX 78704; Wolf Gumbory, (512) 474-8277



**Austin R/C Center**, 9702 Gray Blvd., Austin, TX 78758; Caton Cobb, (512) 832-8144



**Big Mike's R/C Raceway**, 1405 W. Cotton St. (behind the Locker Room), Longview, TX 75604; (903) 297-7814



**Eastex Raceway**, 45000 Hwy. 59 N., New Caney, TX 77357; Heinz Falke, (713) 399-1527



**Hal's Hobby Raceway**, 1440 Bessemer, El Paso, TX 79936; (915) 591-2213



**Heart o' Texas Hobbies & Raceway**, 309 W. Hwy. 190, Copperas Cove, TX 76522; Larry Gholson, (817) 547-7505



**Hobbycraft Speedway**, 819 N. Main St., Corsicana, TX 75110; Keith Hoffman, (903) 872-6761



**Hobbytown USA**, 999 E. Basse Rd., Suite 177, San Antonio, TX 78209; Joe Sena or Clark Baisdon, (210) 829-8697



**Houston R/C Hobbies**, 6338 Skyline Dr., Houston, TX 77057; Lynn Cramer, (713) 266-6006



**Indy R/C World**, 220 Mesquite Village, Mesquite, TX 75150; (214) 271-4844



**Keyser's Hobbies**, 1643 Texas, College Station, TX 77840; Bill Bennett (409) 693-8095



**Rivercity Speedway**, 11731 Wetmore, San Antonio, TX 78247; Ralph Hernandez, (210) 359-6870; Joe Toledo, (210) 341-5652



**Star/Car Raceway**, 5802 Patton St., Corpus Christi, TX 78415; Mike Hellums, (512) 289-0066; Race Hotline, (512) 881-6105



**Star Hobbies**, 1200 Hwy. 100, Box 5, Port Isabel, TX 78578; Fred Carr, (512) 943-7546



**T&T Eagle**, 161 W. Spring Creek Pkwy., #601, Plano, TX 75023; Tony Welborn, (214) 517-0562



**Texas Speedway**, 6707 Chimney Rock, Bellaire, TX 77401



**Wild Bill's Raceway**, 535 E. Shady Grove, Irving, TX 75060; Lynn Morgan or Jerry Williams, (214) 438-9224



## UTAH

**Fastrax**, 355 N. 700 E., Price, UT 84501; Dave Johnson, (801) 637-6603



**Hansen Intermountain R/C Raceway**, 8481 W. 2700 S., Magna, UT 84044; Kevin Hansen, (801) 250-8303



**Power Hobbies and Raceway**, 135 No. 900 E., Suite 7, St. George, UT 84770; April Nutley, (801) 628-8747



**WOR Raceway**, 3170 Brinker Ave., Ogden, UT 84401; Brian Worton, (801) 393-2530



## VERMONT

**Bradford R/C Racing**, Main St., Bradford, VT 05033; Seth Bean, (802) 222-9674



**Mike's Hobbies & Raceway**, 162 N. Main St., Rutland, VT 05701; Stephen Rachlis, (802) 775-0059



**Stoughton Pond Raceway**, Stoughton Pond Rd., Perkinsville, VT 05151; Rick Adams, (802) 263-9321



## VIRGINIA

**Bob's Hobbies & Raceway**, 910-J Brandy Creek Dr., Mechanicsville, VA 23111; Bob Wagner, (804) 746-2758



**Cooper's R/C Raceway**, Rt. 4, Box 122B, Chatham, VA 24531; (804) 724-4182



**Crossroads Hobbies R/C Raceway**, 1104 W. Main St., Salem, VA 24153; Ronnie Black, (703) 387-3414



**Fairystone R/C Speedway**, Rt. 4, Box 918, SR635, Stuart, VA 24171; Pat Moon Jr., (703) 930-3984



**Hobby Hangers Speedway**, 4433 A, Brookfield Corp. Dr., Chantilly, VA 22021; Mark or Billy, (703) 631-8820



**The Hobby House**, 116 Edds Ln., Sterling, VA 20165; Ron Beckman, (703) 444-0333



**KC's Radio Control & Repair**, Rt. 4, Box 312, Trents Ferry Rd., Lynchburg, VA 24503; Curtis or Kim Wright, (804) 384-8596



**Shamroc Raceway**, P.O. Box 3739, Winchester, VA 22601; Kevin Allen, (703) 662-0403



**Timberlake Hobbies**, 212 14th St., Virginia Beach, VA 23451; Doris Crea, (804) 491-8016



**Trackside Hobbies**, 1920 E. Pembroke Ave., Hampton, VA 23663; Rick Cardwell or Tom Gunther, (804) 723-4170



## WASHINGTON

**Alfie's**, 108 South K St., Aberdeen, WA 98520; (206) 533-6638



**Four Season R/C Racing**, 2941 Sleater Kinney Rd. NE, Olympia, WA 98506; Gary & Sharon Brown, (206) 491-2430



**Hale's R/C Raceway Park**, 10611 136th St. E. Puyallup, WA 98374; Walt Hale, (206) 845-7675



**Home Town Hobby**, 116 N. Main Ave., Ridgefield, WA 98642; (206) 887-1769



**L&L R/C Raceway**, 15818 S.E. 287th, Kent, WA 98042; Bob Lewis, (206) 631-1664



**Performance R/C**, P.O. Box 955 (1673 Cedarale Rd.), Mt. Vernon, WA 98273; (206) 755-9464



**Raceway Hobbies**, 188 Sunset Ave. S., Edmonds, WA 98020; Dave or Ron Steen, (206) 774-3285



**Schmidt's Auto Parts**, 10305 Old Hwy. 99, Marysville, WA 98271; Jon Failla, (206) 653-8838



**Skagit R/C Raceway**, 1689 Routon Ln., Burlington, WA 98233; Jeff, (206) 724-3453 or Craig, (206) 755-9464



**Spokane Indoor Raceway**, 6422 E. 2nd Ave., Spokane, WA 99212; Dave Matson, (509) 534-RACE



**Tacoma R/C Raceway Hobbies**, 6305 6th Ave., Tacoma, WA 98406; Nell Bade, (206) 565-1935



**Terror Raceway**, 8012 S. Tacoma Way, Tacoma, WA 98499; Dave Kleinman, (206) 584-8659



## WASHINGTON, D.C.

**BAFB R/CAR**, Bolling Air Force Base, Washington, D.C. 20332; James Leadbetter, (301) 297-4524



## WEST VIRGINIA

**Burr-Fab Raceway**, 90 Davis St., West Union, WV 26456; Mark Travis, (304) 873-2487



**Fulton's R/C Raceway**, 2646 Chapline St., Wheeling, WV 26003; James Fulton, (304) 233-5355

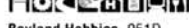


## WISCONSIN

**ABC R/C**, 1441 B East Main St., Waukesha, WI 53186; Dick, (414) 542-1245



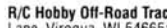
**Antigo Hobby**, 311 Superior St., Suite 7, Antigo, WI 54409; (715) 623-7655



**Bayland Hobbies**, 951D Ashwaubenon, Green Bay, WI 54304; Dan or Jay Boettge, (414) 339-8288



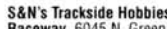
**JJ's Dirt Heaven**, 6028 County K, Champion, WI 54229; (414) 866-9096



**R/C Hobby Off-Road Track**, Lewison Lane, Viroqua, WI 54665; Dan and Diane Sawwell, (608) 637-8221



**Radio Mania**, 129 Harrison St., North Prairie, WI 53153; Bill Bowes, (414) 392-9515



**S&N's Trackside Hobbies and Raceway**, 6045 N. Green Bay Ave., Milwaukee, WI 53209; Scott Ernst, (414) 351-1910

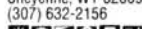


**Sparta R/C Raceway**, R&S, Sparta, WI 54656; Eric Johnson, (608) 269-6613



## WYOMING

**Collectable Creations Off-Road Oval Track**, 1790 Dell Range Blvd., Cheyenne, WY 82009; Phil Severson, (307) 632-2156



## AUSTRALIA

**Aubry R/C Car Club**, Aubry Showgrounds, Aubry, NSW 2640; Ron Langman, 060-247-128



**Illawarra RCECC**, Croome Sporting Complex, Albion Park Rail, NSW 2527; Mel or Andrew, 042-714-683



**Lakeside R/C Racing Car Club**, Hollywood Dr., Lansvale, NSW 2166; R. Bartolozzi, 62-2-907-9800

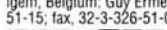


**Wodonga R/C Car Club**, 11 Murphy St., Wodonga, VIC 3690; Ron Langman, 011-6160-247-128

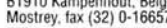


## BELGIUM

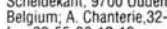
**Cartroubles Indoor Buggy Track**, Jan Moonsstraat 52-56, 2160 Wommelgem, Belgium; Guy Erms 32-3-326-51-15; fax, 32-3-326-51-01



**M.B.V Parc of Relst**, Tenierslaan, 28, B1910 Kampenhout, Belgium; Frank Mostrey, fax (32) 0-16657518

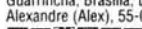


**Model Racing Club Oudenaarde**, Scheldekant, 9700 Oudenaarde, Belgium; A. Chanterie, 32-55-31-36-48; fax, 32-55-30-19-12

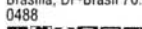


## BRAZIL

**Brasilia R/C Motor Circuit**, Estacionamento do Estadio Mane Guarrincha, Brasilia, DF 70000, Brazil; Alexandre (Alex), 55-061-273-7205



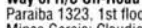
**Hobby Center**, SQS.210 Bl H Apt. 204, Brasilia, DF-Brasil 70.273; 061-242-0488



**Off Roaders**, Av. Guilherme Dummont Villars, 317, Sao Paulo, CEP 05640; Waldir Ielpo, (055) 011-260-5628; fax (055) 011-831-4931

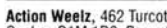


**Way of R/C Off-Road Cerrado**, Rua Paraiba 1323, 1st floor, Belo Horizonte, Minas Gerais; Claudio T. Correa, (031) 227-6111, fax (031) 227-6869

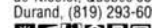


## CANADA

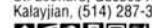
**Action Wheelz**, 462 Turcotte, Vanier, Quebec, G1M 1R6; Regent Tardif, (418) 527-5756



**ATN**, Auto Teleguidee Nicolet, 2000 Rue Paul Hubert, Saint-Jean-Baptiste-de-Nicolet, Quebec J3T 1E5; Louis Durand, (819) 293-6097



**Auto Sprint**, 6065 Des Grands Prairies, St. Leonard, Quebec H3G 2R6; David Kalayjian, (514) 287-3503



**Circuit Pepsi**, Centre de Location, 37 du Roi, Sorel, Quebec; (514) 746-8828



**Circuit R/C Pro**, 1500 Chemin Sullivan, Val d'Or, Quebec; J9P 1M1; R/C Modele Plus, (819) 874-3918



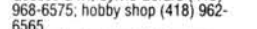
**Circuit Teleguide St. Roch**, 363-B St. Charles, St. Roch De L'Achigan, Quebec J0K 3H0; (514) 588-4254, fax (514) 588-6554



**Club Avatt**, 244 Jules-Richard, Deauville, Quebec J1N 3M2; Daniel Vanier (819) 864-6262



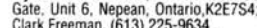
**Club RC SL**, 44 Rue Holliday, Sept-Iles, Quebec G4R; Sylvio Gerard (418) 968-6575; hobby shop (418) 962-6565



**CRCCC**, Box 309, Clinton, Ontario NOM 1L0; Eric Russell (519) 482-9429



**Dynamic Hobbies**, 21 Concourse Gate, Unit 6, Nepean, Ontario K2E7S4; Clark Freeman, (613) 225-9634



**East Coast Model Center Raceway**, 13 Glen Stewart Dr., Suite 1, Southport, Prince Edward Island C1A 8X9; Gary Stephen, (902) 569-3262



**Ronbo's R/C Racing**, RR 1 Glen Walter, Cornwall, Ontario K6H 3G4; Ron Giroux, (613) 936-0176



**Rousillon Hobby Track**, 177-D St-Jean Baptiste, Chateaufort, Quebec J6K 3B4; (514) 398-2151



**Sheldon's Raceway**, Box 597, Cutknife, Saskatchewan; Sheldon Bradlow, 398-2232



**Spinnin Wheel Raceway**, RR 1, Ariss, Ontario N0B 1B0; (519) 824-1614



**South Okanagan Roadhogs**, Skha Lake Rd., Penticton, BC; Willie Lemm, (604) 492-5698



**Strathclair Park**, Old Garden River Rd., Sault Ste. Marie, Ontario P6A 5T1; (705) 759-1855



**Thunder Alley Raceway**, Lambton Mall, 1380 London Rd., Sarnia, Ontario N7S 1P8; Rob Smith, (519) 882-3361



**Vancouver R/C Road Racers**, #100-2733 Barney Hwy., Coquitlam, British Columbia V3E1K9; Roger Brown, (604) 945-3888



## COLUMBIA

**Club De Automodelismo Colombiano**, Centro Recreativo Cafam, Kilometro 14 Autopista Norte, Santafe De Bogota, D.C. Colombia; Jorge Delgado, 1-6130588



**Club De Automodelismo Colombiano**, Centro Comercial Guaymaral, Kilometro 16 Autopista Norte, Santafe De Bogota, D.C. Colombia; Jorge Delgado, 1-6130588



**Garoso Raceway**, Avenida Libertadores con Diagonal Gran Colombia, Cucuta, Colombia; Gabriel Rodriguez, 975-751892



## CYPRUS

**Racing Model Club**, Kennedy Ave. N. 42, Nicosia, Cyprus; Andrea Sotiriou, 493186; fax 493229



## DENMARK

**Brondby Motor Club**, Roskildevejs 460 Rodov, Denmark 2610; Soren Boy Holst, 011-45-31-472-462



**Holstebro R/C Buggy Club**, Mozartsvej 7500 Holstebro, Denmark 2600; Michael Brusholt, 011-45-97-412-734



**Klub 144 Raceway**, Bagsvaerdvej 144A, 2800 Lyngby, Denmark; Henrik Carstens, 45-42-88-3691



**Rainbow Raceway**, Eriksvej 9 Glostrup, Copenhagen 2600; P. Christiansen, 011-45-52-848-504



**Thor Minirace Odense**, Sohussvej 255, Aliso, Odense, Behind Alesso Hallen (Sport Centre), Odense, Denmark; Ulrich Rasmussen, 011-45-65-303-707



## DOMINICAN REP.

**Adoca R/C Speedway**, Feria ganadera, Santo Domingo; (809) 220-5266



**La Barranquilla R/C International Speedway**, Santiago; (809) 582-2303



## ENGLAND

**Chessington Radio Car Club**, Surbiton Sport Club, Riverhill Estate, Worcester Park Rd., Worcester Park, Surrey, England; Ian Spiller, 0252-20657



## FRANCE

**Auto Electron**, 35, rue B. de Ventadour, Limoges, France 87000; M. Boudoul, 55 062763



**Crame Roncq**, 64 rue du Becquerel, 59370 Mons el Baroeul, France; Michael Hondekyn, (33) 20042755



**Lorgies Bolides**, rue Beau-Riuz, 62840 Lorgies, France; Mme. Hourdequin Sabine



## GERMANY

**Dreykorn Raceway**, Heuchlinger-Hauptstr. 43, Lauf, 91207; Hermann Hensel, 09123-81457



**MC Koln**, Bottingstr., Worringen, Germany 50769; Ralf Habel, 02733-477493



**Mini Car Club Dortmund**, Kortschstr. 4, 4600 Dortmund 13, Germany; Roland Schwan, 0231-213609



**Oberhausen-Altstadt**, Am Fesder-turm, Oberhausen, Germany 46099; Josef Holl, 0208-403676



**Panik Raceway**, Teutonen Str. 5, Jroisdorf, Germany 53844; Guido Kraft, 0224-400259



**Stoppelhopper Oberhausen**, Niebuhrstr., Oberhausen, Germany 46049; Matthias Reckward, 02801-1545



## GUAM

**R/C International Raceway**, P.O. Box GK, Agaña; Robert (Buddy) Simpkins, (671) 477-3207



## HONDURAS

**Autodromo Accion**, Quinta Santa Maria, San Pedro Sula, Honduras, Colonia Rivera Hernandez; Eduardo Hondal, (504) 52-2061



## HONG KONG

**H.K.R.C. Model Car Racing Club**, Lot 2130-2137, Ko Po Tsuen, Sha Tau Kok Rd., N.T., Hong Kong; Alex Chan, (852) 659-2822



**Kingsville Buggy Arena**, Wong Chuk Yeung Village, Shatin, N.T.; Pak Yeung, (852) 607-0828



## INDONESIA

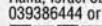
**Everly's Racing**, Palm Str., 188, Surabaya, Jatim, Indonesia; Jhon Mudik, 011-62-31-595-888



**Ircca Off-Road**, Rahanana, Israel; Yaron Zafris, (972) 030549937

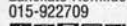


**Nahshoneat**, Abba Nilan Silver Str. 64, Haifa, Israel 32809; Golan Levy, (972) 039386444 or (972) 04231252



## ITALY

**Associazione Modellisti Cossato**, via P. Maffei, Cossato 13014, Biella, Italy; Zanellato Romildo, 015-405881; fax 015-922709



## JAPAN

**Courtney Off-Road**, Camp S.D. Butler, Okinawa, Japan, FPO AP 96379; USMC Arts & Crafts, 011-81-61173-53674



**Foster R/C Raceway**, Camp S.D. Butler, Okinawa, Japan, FPO AP 96379; Camp Foster Arts & Crafts, 011-81-61173-53674



**Hansen Off-Road**, Camp S.D. Butler, Okinawa, Japan, FPO AP 96379; USMC Arts & Crafts, 011-81-61173-53674



**Iwakuni R/C Track**, PSC 561, Box 978, FPO AP 96310-0978; David T. Eck, 011-81-6117-53-3662



**Misawa R/C Raceway**, 13th Fighter Squadron, PSC 76, Box 2585, APO AP 96139-2585; 011-81-176-53-5181, ext. 226-6506



**Yokata R/C Racers**, PSC #78, Box 3619, APO AP 96326, Tokyo, Japan; Victor Giles, 011-81-0425-52-2511 ext 225-9025



**Zama Off-Road Raceway**, 17th ASGCM Unit 45013, Box 3232, APO AP 96338 Japan; SFC Ken Campbell, 011-81-3117-63-8478



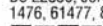
## LEBANON

**Wild Willy RCC**, Oscar St-Jal Eddie, Beirut, Lebanon; 00961-1-403751

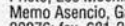


## MEXICO

**Alces Off Road**, Lopez Mateos y Rayod S/N, Ensenada, Baja California, BC 22830; Jorge Bustamante, (667) 6-1476, 61477, 86729



**Baja Jr.**, H. Valdez 151 Pte. Y Gmo. Prieto, Los Mochis Sinaloa 81200; Memo Asencio, Gaby Macias, 681-20276; fax, 681-26430



**Club Kyosho de Automodelismo Departano**, Av. Pacifico 216 Coyacan; Ajusco-Toluca Km 15.3 DE, Mexico 04330, Ing. Jorge Perez Holder, (525) 544-08096; fax, (525) 544-7133



**Hobby Centro**, 12 De Diciembre No. 3070-A, Guadalupe, JAL 45550; Alejandro Ortiz Del Toro, (36) 21-46-28



**Hobby's Formula**, Au observatorio 457 DF 01120; (905) 502-3620



**Hobby Model's Raceway**, Blvd. Garcia de leon, 1555, Morelia, Michoacan 58260; (431) 5-01-22



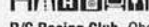
**Jaguar R/C Club**, Calz. Zavaleta 116, Puebla 72150; Chema, Denise or Chiro, (22) 31-00-91, (22) 33-00-94



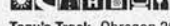
**La Hielera**, Prol Corregidora Nte 350, Queretaro, QRO C.P. 76160; Jorge Morelos Rabell, (42) 12-15-25



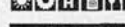
**Pista Casino**, Hotel Casino de la Selva, Cuernavaca, Morelos 16507; Luis Duhart, (73) 19-12-38



**R/C Racing Club**, Obsidiana #2900, Zapopan, Jalisco 44560; Fernando Hernandez, (3) 616-73-47



**Tony's Track**, Obregon 364 Sur, Culicán Sinaloa; Guillermo Prieto, (67) 165708-168141



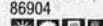
## NETHERLANDS

**H.F.C.C. Hollandia**, De Werf 60, The Hague, The Netherlands; G. de Jong, 031-070-3679820



## NEW ZEALAND

**Counties R/C Raceway**, Pukekohe Showgrounds, Station Rd., Pukekohe, New Zealand; R. Northcott, 09 23 86904



**Harewood Radio Control Car Club**, 550 Sawyers Arms Rd., Christ Church, New Zealand; Dean Johnson, 09 03 3880 344



**Papakura Indoor R/C Car Club**, 25 Tainere Cres., Papakura, Auckland; Colin Perry, (09) 298-4711



**Western District R/C Off-Road Car Club**, CNV Bancroft/Akatea Prive, Auckland; Chris, (09) 838-5201



## NORWAY

**Dalen Raceway**, P.B. 728, 6401 Molde, Norway; Johnny Reitan, 94 64 52 95

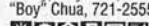


**Hadeland Raceway**, 2750 Gran, Gran Norway; Dag Bakke-Nilsen, 61330405



## PHILIPPINES

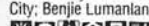
**Boyer R/C Hobby Shop**, Unit No. 10 Lucas Commercial Center, Marcos Hiway, Mayamot, Antipolo, Rizal; Jose "Boy" Chua, 721-2555



**Philippine R/C Association**, B.F. Homes Paranaque, Metro Manila 1700; Ronald/Manny Villafra, 23-30-08



**Quezon City Radio Control Club**, Quezon City Memorial Cir., Quezon City; Benjie Lumanlan, 731-94-53



## SOUTH AFRICA

**Banana County R/C Racing Club**, P.O. Box 988, Margate, 4275; Dennis Steenmans, 27 (0) 391-20975



**Gordons Bay R/C Club (GBRC)**, Andrew Norman Sports Centre, Gordons Bay, Cape Province; Andre Hollander, 024-512865



## SPAIN

**ADAM**, Mina Flores de la Sienna, Madrid, Spain Alvaro Sarabia, 01-7471113



**Club Modelismo Catilla**, P.O. Box 491, Burgos, Spain 09080; A.J. Pereda, 011-34-47-240130



**Club Social Sevillana**, Crta. Pulianas S/N, Granada, Spain; Oscar Saenz, 958-275282



**Motoclub Castellon R.C.**, Rafalafena, S/N, 12004 Castellon, Spain; Octavio Traver, (34) 64 229705, (34) 64 237411



**Outlaw-Ultime II**, Puerto Rico 27, Madrid, Spain 28016; Juan Vacas, (34) 915197298



**ROARCR**, Naval Station, Rota, Spain (P.O. Box 53, FPO NY, NY 09540-0013); PO Kelly Sexton, 011-34-56-822652

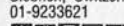


**CRAEM**, La Elipa, Madrid, Spain; Pablo Lorente, 91-3865952

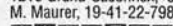


## SWITZERLAND

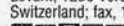
**E.M.B.C.M. Raceway**, Main Street, opposite police station, 8854 Snieben, Switzerland; Markus Schmid, 01-9233621



**ERMC Raceway**, 14 Ch de Tavernay, 1218 Grand-Saconnex, Switzerland; M. Maurer, 19-41-22-798-9765

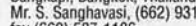


**JMRCV-Terraindu Levant**, Chemin ou Levant, 1290 Versoix, Geneva, Switzerland; fax, 19 41 22 7790805



## THAILAND

**Bangkok R/C Spa Huamark**, 164/1 Lardprao SOI 96, Wangthonglang Bangkok, Bangkok, Thailand 10310; Mr. S. Sanghavi, (662) 931-8390, fax (662) 587-1186



## VENEZUELA

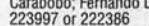
**Las Fuentes R/C Club**, 2da Calle las Fuentes El Paraiso, Caracas, DF 1020; Franco Agrusa, (02) 461-72 55



**R/C Mariche**, KM4 Zona Industrial, Del Este Via Mariche, Caracas, DF 1070-A; Bruno Morganti, 58-02-241-3969 or 241-4993



**Robin R/C Racing Club**, Avenida Bolivar CC Luz #1, Valendia, Edo., Carabobo; Fernando León, (041) 223997 or 222386



## WEST INDIES

**Island Raceway**, 8 Mile Post Jacks Hill, St. Andrew, Jamaica, West Indies; Rodney Littau, (809) 926-7034 or 927-1198



## ZIMBABWE

**Mosi-Oa-Tunya**, H9619 Highland Harare, Harare Country, Masloraland, Zimbabwe; 46237



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| <input type="checkbox"/> Indoor   | <input type="checkbox"/> Asphalt            |
| <input type="checkbox"/> Outdoor  | <input type="checkbox"/> On-site hobby shop |
| <input type="checkbox"/> Off-road | <input type="checkbox"/> AC power           |





CHRIS'

# BACK LOT

**This is my page—mine!**

The opinions expressed on this page do not necessarily represent the opinions of the entire *Car Action* staff. Any resemblance to reality is purely coincidental. Send your correspondence, hate mail, love letters, photographs—anything you like—to Chris's Back Lot, c/o RCCA, 251 Danbury Rd., Wilton, CT 06897.

**"I just gotta get sponsored!"**

I can't ignore the problem anymore. Over the past few months, it has built up toward detonation, and it must be dealt with. The letters—the phone calls—all with the same burning concern...

## **"I JUST GOTTA GET SPONSORED!"**

Shut up already! Some guy starts winning races at his local track and the next thing you know, he's phoning Trinity for free motors and batteries so that he can make the "A" when he goes to the Nats next year. Man, I've heard this story so many times.

Here's the deal: you don't have to have a sponsor to win races. When he started, Brian Kinwald won against the best factory drivers in

Southern California without any sponsors whatsoever. He did this by logging hours and hours of practice and getting to know what to do to his car to make it work its best on different tracks. Yes, Brian eventually became a sponsored driver, but that leads to my next point...

## **"HOW DO I GET SPONSORED?"**

Why do people want to be sponsored anyway? Racing is supposed to be a hobby, but when you're sponsored, you're expected to come through with the goods; in other words, it's win or walk. How much fun is that?

But if you just *can't* be happy as the local hot-shot, here's some sound advice to heed before you decide to pick up the phone and annoy some hapless R/C company.

- **Prepare a professional-looking resumé.** List your racing accomplishments. Winning is important, but sometimes placing in the top three or even making the A-main counts, depending on the size and importance of the event. When you've finished, read what you've written. If your crowning accomplishment is winning "Cobb's Hardware's Crescent-wrench Trophy Dash," then consider a longer career as a privateer.
- **Be an ambassador for the hobby.** Show that you are capable of repre-

senting a company in a professional manner. Be courteous to other drivers, and help them when you can. Be the first to volunteer for turn-marshalling duties or track maintenance. And never ever lose your cool on the drivers' stand. Start this behavior now, before you're sponsored, so that it becomes second nature. Believe me, sponsors want the fastest drivers, but they often pass up the one who's a jerk.

- **Win a big race.** Is this an obvious one or what? If you really wanna be a "hero" driver, then pack up your gear, take time off work or school and go to a big, national-level race. Once you're there, take a good look around; you'll get a pretty good idea what it's like to be a sponsored driver by watching them in action. Looks like fun—NOT! All the pressure and stress can take its toll. Why? Because sponsored drivers *have* to win! If you're some kind of masochist still bent on getting sponsored, do your talking on the track. If you can do that, the rest will follow naturally.

Life is too full of stress as it is. Why turn your hobby into another source of pressure? Me? I'd rather be one of the guys in the pits playing tire-toss... "Oh, is my Main up?"

—by Frank Masi

